

# MAXIMUM POWER GAMING

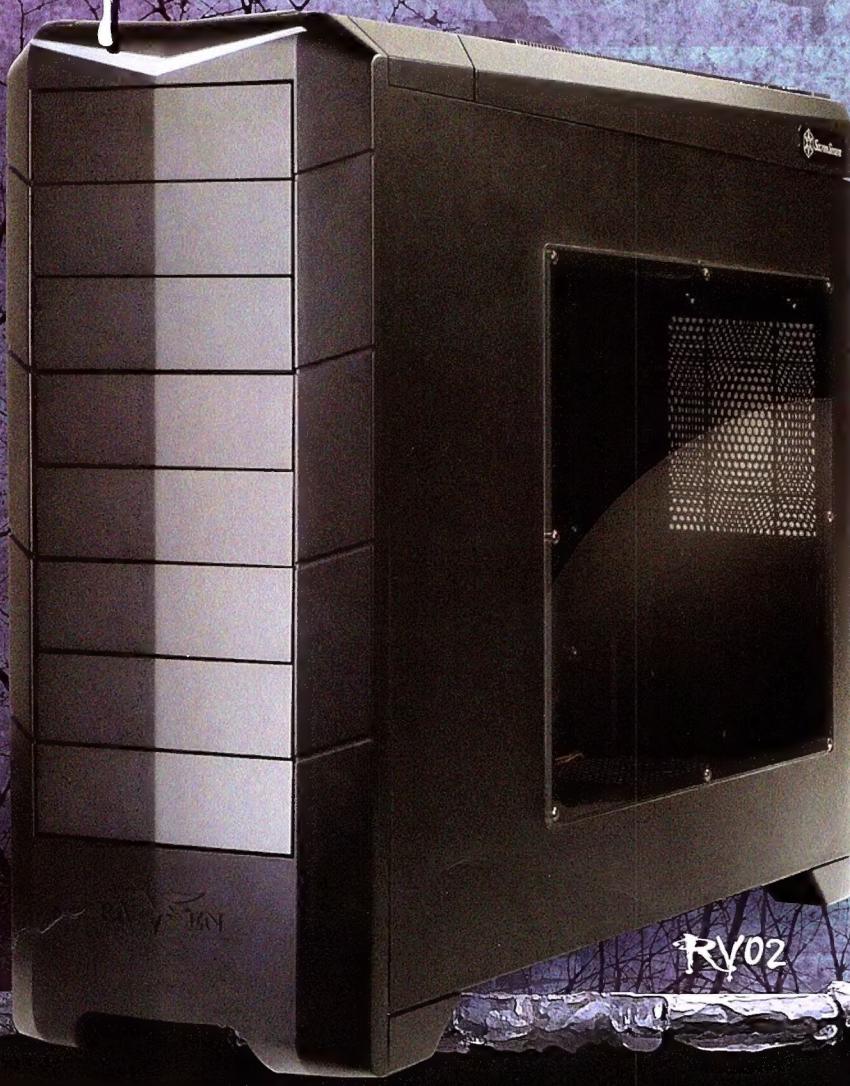
# atomic



- MEDAL OF HONOR • BUDGET GAMING PC •
- PSU ROUNDUP • WOW ANNIVERSARY • AVATAR •

# RAVEN 2

## The King is Reborn!



### Key Features:

- Revolutionary 90° motherboard mounting from RAVEN RV01.
- Three 180mm fans for unprecedented positive pressure and stack effect cooling.
- Supports liquid cooling radiator mounting
- Motherboard back plate opening behind CPU area for quick cooler assembly.
- Supports 11" wide ATX motherboard
- Supports eight expansion slots
- Updated hard drive suspension system to prevent drive noise.



#### NSW

IJK Computers & Parts	02 9745 0877	ijk.com.au
Orange IT	02 9281 8982	orangeit.com.au
Megaware Computers	02 9698 1593	megaware.com.au
Aus PC-Market	02 9646 8010	auspcmarket.com.au
Internet Technology	02 8004 3033	i-tech.com.au
Mwave	1300 727 446	mwave.com.au

#### WA

Austin Computers	08 9201 2788	austin.net.au
Netplus Micro Computer	08 9242 7288	netplus.com.au
PLE Computers	08 9309 4771	ple.com.au

#### VIC

PC Case Gear	03 9544 7895	piccasegear.com.au
Scorpion Technology	1300 726 770	scorpiec.com.au
CentreCom		centrec.com.au
CPL Distribution	03 8542 8688	cpl.net.au
<b>SA</b>		
Allneeds Computers	08 8211 8661	allneeds.com.au
Hypernet	08 6340 2021	hypernetdist.com.au
MATS Systems	08 8186 2110	mats-systems.com.au
Photech Computers	08 8349 4334	photech.com.au
Getright Computers	08 8231 0622	getright.com.au

#### QLD

Umart Online	07 3369 3928	umart.com.au
Computer Alliance	07 3420 3200	computeralliance.com.au
<b>TAS</b>		
Principal Computers	03 6235 5000	principalcomputers.com.au
Taspro Computers	03 6424 1911	taspro.com.au
<b>ACT</b>		
Principal Computers	02 6223 2477	principalcomputers.com.au
<b>HAMILTON</b>		
PB Technologies	07 839 6518	pbtech.com.nz
<b>CHRISTCHURCH</b>		
Dragon PC	03 366 6621	dragonpc.co.nz

#### AUCKLAND

Playtech	09 415 1020	playtech.co.nz
Computer Lounge	09 368 4818	computergounge.co.nz
Extreme PC	09 849 4888	extremepc.co.nz
Compulink Systems	09 368 9011	computlink.co.nz
<b>WELLINGTON</b>		
In House Computers	06 355 4774	inhouse.co.nz
Quay Computers	04 499 3368	quay.co.nz
VR Concepts	06 354 5786	vrconcepts.co.nz
Ascent Technology	04 802 3898	ascent.co.nz



**SILVERSTONE®**  
Designing Inspiration

# HIS

Faster, Cooler, Quieter



## The innovative IceQ+ Cooling Technology

# HIS HD 5750 IceQ+ 1GB GDDR5



HIS HD 5970 2GB GDDR5 PCIe



HIS HD 5870 1GB GDDR5 PCIe



HIS HD 5770 Fan 1GB GDDR5 PCIe



New design offers increased ability to transfer thermal energy—offers rapid cooling



Cool air is pulled in from both sides of the fan and heat energy is expelled directly out of the chassis - which ensures great cooling at all



Noise levels are reduced and the service life of the graphic is increased



Perfect for modded chassis - add a UV light and watch your HIS card radiate beautifully



The unique airflows system of the IceQ+ cooler means that even when additional cards are fitted in a CrossFire configuration, each GPU will remain cool

**LTECH**  
COMPUTERS  
COM.AU

auspcmarket.com.au  
msy.com.au  
arc.com.au  
itestate.com.au  
skycomp.com.au  
  
netplus.com.au  
msy.com.au  
netsolution.com.au  
foxcomp.com.au

**QLD**

Umart Online 07 3369 3928 umart.com.au  
Game Dude 07 3387 1500 gamedude.com.au  
PC Superstore 1300 799 522 pcsuperstore.com.au  
ITS Direct 07 5406 5588 itsdirect.com.au  
MSY Technology 07 3290 1908 msy.com.au  
**SA**  
Allneeds Computers 08 8211 8661 allneeds.com.au  
Getright Computers 08 8231 0622 getright.com.au  
MATS Systems 08 8186 2110 mats-systems.com.au

**VIC**

MSY Technology 03 9560 2288 msy.com.au  
CentreCom 1300 007 600 centrecom.com.au  
PC Case Gear 03 9584 7266 pccasegear.com  
Scorpion Technology 1300 726 770 scorpotec.com.au  
**TAS**  
Principal Computers 03 6235 5010 principalcomputers.com.au  
Taspro Computers 03 6424 1911 taspro.com.au  
**ACT**  
Principal Computers 02 6223 2477 principalcomputers.com.au

**NT**

JPG Computers 08 8952 2040  
**AUCKLAND**  
Compulink Systems 09 368 9011 www.compulink.co.nz  
Ezone 09 303 3883  
**HAMILTON**  
Promax Computers 07 848 2054 www.promax.co.nz  
**PALMERSTON**  
VR Concepts 06 354 5786 www.vrconcepts.co.nz  
**TAURANGA**  
Hitek System 027 471 1771

# EDHEAD

## Not quite free at last

Last issue, I complained about the lack of movement on the R18 games rating front. This issue, as we report in LogIn, I'm happy to say we finally have some forward momentum.

After a two year wait, the Government has released a discussion paper on the issue, and is requesting comment from interested parties – in other words, gamers like you and me, mums and dads of gamers, maybe even people who've never heard of the problem, but are swallowing Attorney General Atkinson's argument against (that gamers just want to play rape sims and eat babies for points - WTF!) hook, line and sinker.

So, this is a big opportunity.

Not only can we get our own voice heard, but in the larger picture, we can also talk to our friends and families to seek their support - to educate them on just how important this is to the local games industry.

Now is your chance to make an impact. Imagine whole families making their response to this paper – entire families are being targeted as game consumers, now, so why not? Look at the Wii console. I just can't help but imagine the impact of getting entire generations of gamers coming together to make share their opinions on the matter.

And hopefully they can do it without coming across all "U R a noob, Atkin-butt – give me my gamez and warez! LOLzzz 11!11!"

Sigh.

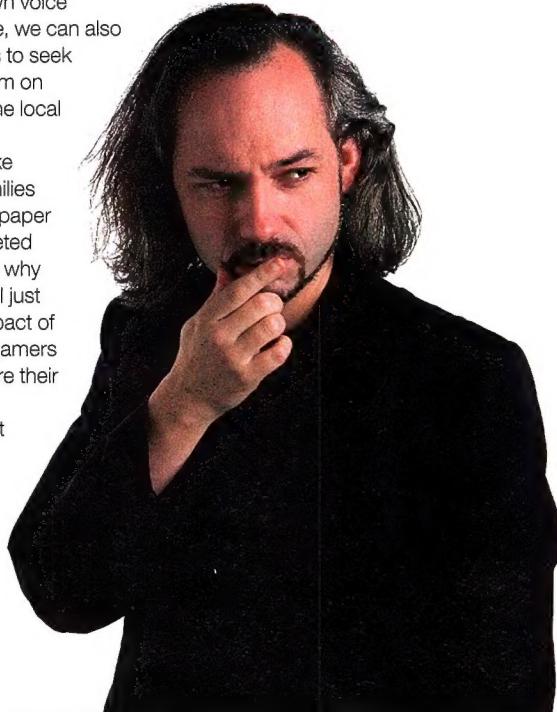
Of course, life is a game of give and take, and while this opportunity opens up, something's gotta go wrong

somewhere else. There's apparently no such thing as a free Karmic ride, and the announcement a day after the good R18 news that the Internet filtering program is going ahead is the bitter ying to the sugary sweet yang (or is that the other way round?).

In the immortal words of Adam West's Batman, "Some days a guy just can't get rid of a bomb."

We know how he feels.

David Hollingworth  
[dhollingworth@atomicmpc.com.au](mailto:dhollingworth@atomicmpc.com.au)  
Twitter: [@AtomicMPC](#)  
Facebook: [AtomicMPC](#)



## atomicCREW

**editorial**  
[editor@atomicmpc.com.au](mailto:editor@atomicmpc.com.au)  
editor david hollingworth  
deputy editor justin robinson

**design**  
art director david west  
product photography jason busch  
creative director sam grimmer  
**contributors:** dan rutter, ashton mills, chris taylor, jake carrol, seamus byrne, ben mansill

**production**  
group production manager angela sutherland  
production manager ewa grygier  
printed by webstar  
**distributed by**  
network distribution company  
(02) 9282 8777  
gordon & gotch new zealand  
(09) 625 3005

**advertising + marketing**  
t+61 2 8399 3611 f+61 2 8399 3622  
group advertising manager joanne nichols  
[jnichols@haymarketmedia.com.au](mailto:jnichols@haymarketmedia.com.au)  
**haymarket media**  
t+61 2 8399 3611 f+61 2 8399 3622  
52 victoria street, mcmahons point  
nsw 2060  
**managing director** jeremy vaughan  
**commercial director** darren mcnally  
**publishing manager** phil vella

haymarket

Atomic: Maximum Power Computing is published monthly by Haymarket Media. Company registered in Australia (ABN 61 083 063 914). This publication may not be reproduced or transmitted in whole or in part without the express written permission of the publisher. **Liability:** While every care has been taken in the preparation of this magazine, the publisher cannot be held responsible for the accuracy of the information herein, or any consequence arising from it. Please note that all review judgements have been made in the context of equipment available to Atomic at time of review. **Editorial and product submissions:** Atomic welcomes all information on new and upgraded products and services for possible editorial coverage. However, we respectfully point out that the magazine is not obliged to either review or return unsolicited products. The Editor welcomes ideas for articles, preferably sent in outline form, with details of the author's background and a few samples of previously published work. We cannot accept responsibility for unsolicited copy and stress that it may take some time for a reply relating to these submissions to be sent out. Editorial items in Atomic originally published by Dennis Publishing remain the copyright of Dennis Publishing.



# 109

ISSUE

## LOGIN

Gearbox  
All the best new stuff.

X-Ray  
A short history of piracy.

I/O  
Our monthly helpdesk.

Build a budget game box  
And a mighty powerful media box as well!  
COVER STORY



7  
8

10

16

20

# SUBSCRIBE & WIN

pg 88



# February



pg 50

## HARDWARE

**MOTHERBOARDS**  
 ASUS P6X58D Premium

29

**GIGABYTE X58A-UD7**

37

**EVGA P55 SLI**

38

**VIDEO CARDS**  
 XFX 5850

39

**Leadtek GT240**

40

**Galaxy GT240**

41

**Manli 5870**

42

**MEMORY**

A-Data X-series PC3-16000 CL9

43

**Patriot Viper2 'Sector 5'**  
 PC4-16000 CL8

45

**POWER SUPPLIES**  
 HuntKey X7 900W

43

**PERIPHERALS**  
 Razer Orochi Mobile  
 Gaming Mouse

44

**MONITORS**  
 Viewsonic VG2427WM

45

**SYSTEM:**  
 NRG Typhoon

46

**PC CASES**  
 SilverStone Fortress FT02

47

**IKONIK Ra X10**

48

## HEAD2HEAD

**Power Supplies**  
**COVER STORY**

50

## TUTORIALS

**Atomic.edu**  
 Chris Taylor takes another  
 look at TAFE institutes and  
 what they can do for you.

71

72

## GAMEPLAY

**ENGINE ROOM:**  
**Medal of Honor**

75

 In-depth look at war done right.  
**COVER STORY**

76

**Mod Matters**

82

**WoW Anniversary Special**

84

**Red Dead Redemption**

88

**GTA: Chinatown Wars**

91

**Metro 2033**

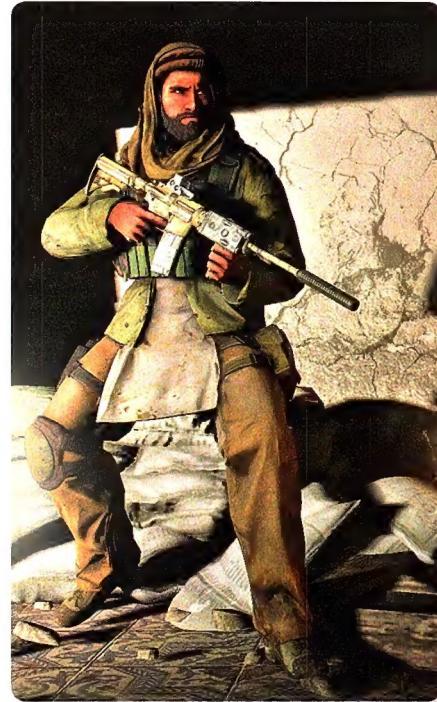
92

**Avatar: The Game**

95



pg 45



# Pioneer of Innovative Technology

**Up to \$300 Bonus for Every Notebook and PC**

Free MS Works V9, MS Flight Simulator, MS Ages of Empires, MS Zoo Tycoon, Carry Bag.

## DreamBook Power W76

**From \$799**

RRP Inc-GST



nVidia GeForce 105M 512MB

- Great value and performance
- Intel Dual Core/Core 2 Duo Processor
- Up to 4GB DDR2 Memory
- 15.6" Wide 1366x768 (16:9) LED Display
- nVidia GeForce Go 105M 512MB Graphics
- Optional 802.11b/g/n Wireless, Bluetooth, Integrated 2 Mega Pixel Camera

## DreamBook Light T11 CULV

**From \$599**

RRP Inc-GST



ATI Radeon X1270

- AMD Yukon 210U 1.5G CULV Processor
- Up to 2GB DDR2 Memory
- 13.3" Widescreen WXGA Display
- ATI Radeon X1270, Up to 256MB Graphics
- SATA Hard Drive, Optional Internal DVD
- Optional 802.11b/g Wireless, Bluetooth, Integrated 1.3 Mega Pixel Camera

## DreamBook Power TW9 i7

**From \$1499**

RRP Inc-GST



nVidia GeForce GT 240

- Great value high performance workstation
- Intel Core i7 Mobile Processor
- Up to 8GB DDR3 Memory
- 15.6" Wide 1366x768 (16:9) LED Display
- nVidia GeForce GT 240 1G GDDR3 VRAM
- PCI Express Graphics
- 4-in-1 Card Reader, High Definition Audio

## DreamBook Power W86 i7

**From \$2999**

RRP Inc-GST



nVidia GeForce GTX 280M

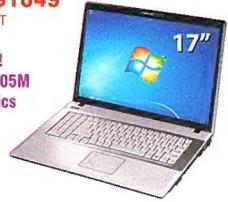
- Intel Core i7 Mobile Processor
- Up to 8GB DDR3 1333MHz Memory
- 15.6" HD+(16:9, 1600x900) Crystal Bright
- nVidia GeForce GTX 280M 1GB DDR3 Graphics
- SATA Hard Drive, DVD-/+RW/Blu-ray Doule Layer
- Optional 3.5G Broadband, 802.11b/g/n Wireless, Bluetooth, Integrated 2 Mega Pixel Camera

## DreamBook Power M77

**From \$1049**

RRP Inc-GST

New!  
nVidia 105M  
Graphics



- New HIGH PERFORMANCE notebook
- Intel CENTRINO 2 Dual Core Processor
- Up to 4GB DDR2 Memory
- 17" Widescreen WXGA Display
- nVidia GeForce G 105M 512MB dedicated PCI Express Graphics
- Integrated 1.3 Mega Pixel Camera

## DreamBook Power M57T

**From \$2599**

RRP Inc-GST



- High Performance Workstation
- Intel CENTRINO 2 Dual Core Processor
- Up to 8GB DDR3 1333MHz Memory
- nVidia GeForce Go 9800GT 512MB/9800GTX 1GB
- 17.1" Widescreen WUXGA Crystal Bright Display
- Free Fingerprint Reader
- 2 Mega Pixel Camera

## DreamBook Power M86

**From \$2199**

RRP Inc-GST



nVidia  
GTX 260M

- Ultra High End Compact Workstation
- Intel CENTRINO 2 Dual Core Processor
- Up to 8GB DDR3 1333MHz Memory
- nVidia GeForce Go GTX 260M 1GB DDR3
- PCI Express Graphics
- 15.4" Widescreen WXGA/WUXGA Crystal Bright
- 2 Mega Pixel Camera

## DreamBook Power W87 i7

**From \$3199**

RRP Inc-GST



nVidia GeForce  
GTX 280M

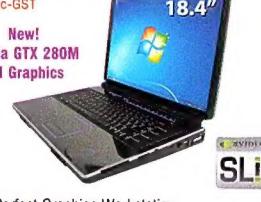
- Intel Core i7 Mobile Quad Core Processor
- Up to 8GB DDR3 1333MHz Memory
- 17.3" Full HD (16:9, 1920x1080) Crystal Bright
- nVidia GeForce Go GTX 280M 1GB DDR3
- Optional RAID 0/1, Blu Ray, TV Tuner, 802.11b/g/n
- Microsoft Windows® 7 Home Premium Edition
- Microsoft® Office 2007 Small Business Edition

## DreamBook Power M98

**From \$3899**

RRP Inc-GST

New!  
nVidia GTX 280M  
SLI Graphics



## DreamBook Power D90 i7 Extreme

**From \$3699**

RRP Inc-GST

New!  
nVidia GTX 280M  
Graphics



FIRST  
i7 Notebook!!!

- Intel Core i7 Processor & Intel Extreme Chipset
- Up to 12GB DDR3 1333MHz Memory
- nVidia GeForce Go GTX 280M 1GB DDR3
- 17.1" Widescreen WUXGA Crystal Bright Display
- 3 x SATA2 Hard Drives with RAID 0/1/5 support
- Optional TV Tuner, 1.3 Mega Pixel Camera, Wireless 802.11b/g/n, Bluetooth

## DreamBook Power 9070

**From \$1499**

RRP Inc-GST



New  
HYBRID SLI  
Graphics

- Advanced Power Saving high end workstation
- Intel CENTRINO 2 Dual Core Processor
- nVidia GeForce Go 9600M GS-512MB + 9100GM Up to 256MB Hybrid SLI PCI-E Graphics
- 18.4" Wide WUXGA (16:9) Crystal Bright Display
- Optional TV Tuner, 1.3 Mega Pixel Camera, Wireless 802.11b/g/n, Blu-Ray, Bluetooth

## DreamVision Power i7 PC

**From \$899**

RRP Inc-GST



- New high performance Intel i7 Chipset
- Intel Core i7 Quad Core CPU
- Up to 12GB DDR3 Memory
- Up to 2 x nVidia GeForce GTX 295 1792MB 896bit GDDR3 PCI Express Graphics Cards
- Up to 3 SATA Hard Drives RAID 0/1/5
- Multiple case choices & customisable options

All prices include GST, exclude freight, all images are for illustrative purposes only. Errors and omissions excepted. Free 1 Year On-site Pickup & Return Warranty, 2 and 3 Years Optional.

• ISO 9001 Quality Endorsed Company QEC11489 - Commonwealth Government Endorsed Supplier 263 - State, Local, Government, Education Contract Supplier

**PIONEER**  
COMPUTERS AUSTRALIA

*Build your own dream!*  
**www.pioneer.net.au**

1300 883 218 / sales@pioneer.net.au

Unit 2, 37 O'Riordan St, Alexandria NSW 2015 Australia

NSW (02) 9690 2888 QLD (07) 3257 3879 VIC (03) 8790 1830 NZ (649) 377 0497 Fax (02) 9690 0333

**Dreamcare.com.au**

New online service and support  
for all brands of PCs, Notebooks  
and Servers.

# R18+ discussion paper finally released

The R18 cat's out of the bag, and the Government wants your views - so tell them!

The near-mythical R18+ discussion paper, sat on by the government for two years, has finally been released for public scrutiny and discussion.

"I urge everyone with an interest in this issue to contribute to the discussion so the Government can ensure all community views are considered," said the Minister for Home Affairs, Brendan O'Connor, in a press release that went out to interested parties last night.

"We are releasing a discussion paper rather

than proposing a change so we have an opportunity to gauge all community views on the subject," he added in the release.

The paper can be found at <http://www.ag.gov.au/gamesclassification>, and there is a submission template that can be emailed, faxed or posted to the government.

Gamers, now is the time for your voice to be heard, but don't abuse this opportunity – don't waste your voice with the kind of threats

and whining that usually finds its way into the comments on this topic on forums all over the country. Show the Government, and our old friend Attorney General Atkinson, that mature gamers can be considered in their thoughts, clear in their demands, and understanding of the larger ramifications of receiving an R18+ rating.

This is what we've been waiting for – make the most of it, fellow gamers.

# OFLC bans ultra-violent Aliens vs Predator game

Speaking of R18 games...



In a move that is sure to anger the gaming community once again, the Office of Film and Literature Classification, otherwise known as the OFLC, has banned SEGA's latest game – Aliens vs. Predator.

While other games have fallen under the restrictive umbrella of the OFLC in the past due to drug use (Fallout 3) or adult themes, Aliens vs. Predator has been banned due to excessive violence in a similar manner to the recently-released Left 4 Dead 2.

There's always the possibility that this game will have the offending content edited out to pass the OFLC's strict guidelines, but another refusal reinforces the incorrect idea that gamers are all children.

As explained to Gamespot, the OFLC sent through the reasons behind their decision:

The game contains first-person perspective, close-up depictions of human characters being subjected to various types of violence, including explicit decapitation and dismemberment as well as locational damage such as stabbing through the chest, mouth,

throat, or eyes," the board report stated.

"Characters can be stabbed with a Predator's wrist blade or an Alien's tail in depictions reminiscent of impalement. The Predator collects 'trophies' by explicitly ripping off human heads, their spinal columns dangling from severed necks. Heads can be twisted completely around in order to break a character's neck. Eyes can be stabbed through or gouged, leaving empty, bloodied eye sockets.

"It is noted that a player is able to combine manoeuvres together in quick succession, which further increases impact; for example, a Predator can stab a character through both eyes with its wrist blade and rip off their head, with spinal column still attached. Extensive post-mortem damage, including decapitation and dismemberment, is also possible."

There's not much that can be done now until SEGA decides what to do with their game, so keep tuned in for any news during the lead-up to the game's release in February 2010.



December's always a busy month on the forums, and this one just past has been no different. We've had a mess of stuff to choose from, both dug up by us, and user-nominated; so who came out on top with the solid gold this month?

Whose posting reigns supreme?

**Khirareq!** With this excellent dissection of DVD locks, and how to get around them. <http://forums.atomicmpc.com.au/index.php?showtopic=25425&st=0&p=509489&#entry509489>



Bravo! Very Atomic stuff right there. So Khir

goes home with the mighty Cybersnipe mouse, but things don't end there – here are our runners' up:

**Fat\_Bodybuilder**, for his... oopsie moment. <http://forums.atomicmpc.com.au/index.php?showtopic=24807&st=0&p=497102&#entry497102>

**nEX**, who broke down Steam in all its glorious complexity! <http://forums.atomicmpc.com.au/index.php?showtopic=24802&st=0&p=496981&#entry496981>

And **kikz**, for some excellent work advice on contract rates. <http://forums.atomicmpc.com.au/index.php?showtopic=25266&view=findpost&p=505941>



**Digital World Warehouse**  
The specialist IT distributor

# GEARBOX

All the coolest gadgets & gear.





## 1. Rockband Wireless Wooden Fender Stratocaster

Price \$US300 Website [www.fender.com](http://www.fender.com)

One of the things that keeps us away from playing games like Rock Band or Guitar Hero is the fact that no one can ever look good using one of those silly, scaled down plastic guitars. Personally, guitar is all about rocking out like some axe-wielding metal god, not some weird plastic plucking loon.

Of course, this new 'controller' from Fender leaves us with no excuse.

It's a real wooden replica of the iconic Stratocaster model, made famous by guitar greats from Jeff Beck and Eric Clapton to Mark Knopfler and John Lennon. And now... you. And remember – rock out responsibly.

## 2. Gorillatorch

Price \$49.95 Website [www.joby.com](http://www.joby.com)

It's an odd but universal truth that the stars of detective shows are graced with superpowers. They never drop their lockpicks at the wrong moment, can apparently read important documents in low light, and always have a tiny torch handy. We want in on that action – and the Gorillatorch (ook!) might be our answer.

From the same folks who bought you the awesomely handy Gorillapod for your camera comes this handy gripping torch stand. It can wrap around everything from your wrist to your workdesk, and even features magnetic feet so you can slap it on any fridge. All it needs is its own locomotive power, and it'll be perfect (and, possibly, very scary).

## 3. Sony CMTBX20iB iPod Docking Micro hi-fi system

Price \$329 Website [www.sony.com.au](http://www.sony.com.au)

If there's one thing you can rely on Sony for it's cool tech. And big names... Let me start again.

If there's two things you can rely on Sony for, it's cool tech with big names that simply don't roll off the tongue in any way.

The CMTBX20iB (Sony could really learn a lesson from Apple here) is a neat little micro system that combines some elegant minimalist design with docking functionality to attach your iPod to. What? You don't own an iPod? Well... move along.

Otherwise, you've got a CD player, radio, audio in for greater connectivity and a funky little remote that you can lose behind the lounge after your next big party.

It's important to plan these things.

## 4. Olin Portable DVD Player

Price \$99 Website [www.kmart.com.au](http://www.kmart.com.au)

Yes, a Kmart product in Gearbox! Can you tell it's a slow month for gadgets?

We can!

The Olin portable DVD player is a convenient little device for those of us too lazy to actually properly encode their media collection. Why both with the so-called 'easy way' of copying stuff onto your iPod or laptop, when you can carry round a single-use device that also necessitates you carry your bulky DVD media with you? Why indeed!?

With this massive 7in screen you can enjoy all the greats from your boxsets of The Waltons and Little House on the Prairie, while listening to them on the gloriously tinny built-in speakers. But wait, there's less – the Olin player comes with a handy-dandy headrest mounting bag... And we have no idea with that does!

Also, it's pink. So... yeah.

## 5. Noteball

Price \$25 Website [www.noteball.com.au](http://www.noteball.com.au)

Listen, up, boy, I've got just the thing you need. It'll cure boredom; it'll get ride of your hives; it'll put a shine on your shoes, and even make you popular with members of the gender or genders of your choice.

What is it, I hear you ask? Ladies and gentlemen...

THE BALL!

*[cue sound of whistling wind, rolling tumbleweeds, and, somewhere, a lone pair of hands clapping]*

Okay, would you believe it's a handy way to prop up your notebook?



# The pirate life for me

**Jake Carroll** puts on an eye-patch and looks into the history of software piracy and protection.

**W**ay back when, in the 1970s, a young San Franciscan man was unwrapping some fine shiny software for his Apple II.

A few days later, he started wondering about the real value of the 0s and 1s on that floppy disk. After eating a month old Twinkie and riding a sugar high, he decided to try something brash. He was going to copy that software, somehow, and give it to a friend.

That pivotal day was the beginning of software piracy.

This month we're investigating software piracy. Piracy has a significant impact on both the hardware and software industry, to the point where we've had to change the landscape and economics of the gadgets and tools we buy, in order to accommodate the phenomenon. Don your pirate hat, talk to some guy called Uncle Torrence and put a 'z' on the end of every word. We're sailing into uncharted waters.

## The ethos

Over the years, longitudinal studies have been carried out using psychological profiling in an attempt to understand why people pirate software. Studies such as the Triandis Theory of Interpersonal Behaviour in understanding software piracy (Robinson et al, 2009) and Factors Contributing to the Understanding of Software Piracy among College Students (Liang et al, 2005) have attempted to broaden

our knowledge. The findings of the studies revolve around:

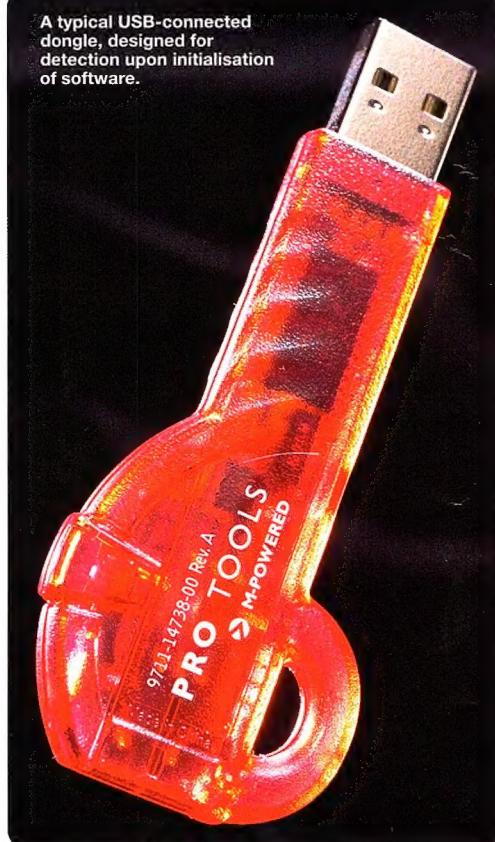
- The economics of stealing (you're getting something for nothing).
- Soft distribution mechanism (because its software, it can be shuffled from place to place without thought or regard for the actual source).
- Convenience (digital content protection mechanisms and physical media are so convoluted, the argument goes, that its more simple to just jump on bit torrent and do a little torrent window shopping).
- The white hat conquest (the crackers of our world enjoy breaking software protection mechanisms as an intellectual challenge, and nothing more).
- The black hat conquest (the profiteers of mass duplication, sale and counterfeit of software).

Regardless of piracy being morally wrong, and criminal, there are different motivators for different subsets of users.

## From the dawn of time

To begin with, piracy was almost an innocent concept; people really didn't think too much about the implications. In the days of the cassette tape and 5.25in floppy media, copying things was a slightly painful process. Neither ProDOS nor DOS 3.3 had built in copy

A typical USB-connected dongle, designed for detection upon initialisation of software.



applications, or utilities, so third party tools such as Disk Muncher came about. Still nobody thought much of it in terms of crime or illegal behaviour. At some point in time, somebody realised it was hurting profits. Of all the somebodies... it was a games company.

## The humble checksum

To begin with, copy protection methodologies were primitive. Software was installed with a sub routine that checked to see if the original hexadecimal offset was present on the media. If not, software could make the inference that the media was a 'copy' and not the original. In a similar situation, checksums and 'intentional corruption' were used as a means for applications and software engineers to prevent unwanted piracy.

The use of checksum techniques on shared media meant that when a user intentionally copied something from a disk onto another media type, it would slightly change something about that data, even if it were the headers of a file or table of contents. A small routine would run around and 'sum' looking for a known result, and if the result was wrong, the inference was the user was attempting to run from an illegitimate source. This got old pretty fast. People got sick of being tied to one form of media for all reads, loads and application dependence.

## Dongle

In 1980, a software firm produced a piece of software known as WordCraft. The company became the first to ship a hardware protection mechanism to control software usage and piracy. Enter, the 'Dongle'. The premise behind the dongle was simple. You couldn't start a piece of software without the dongle, or 'key', being inserted into the computer, be it through a serial port, or a PET cassette port (as it was on the Commodore 64).

Over time, the concept of the dongle became more and more refined, with everything from simple UART (Universal Asynchronous Receiver Transmitter) systems being used to 'test' the validity of a dongle, to small microprocessors even being embedded in the devices. The more complex these systems became, ironically, the simpler they were to crack. The reason for this was the exposure through bus tracing of the protocol being used to negotiate the transaction between the software a user would run, and the hardware dongle. In trivialised dongle systems, the designer might simply put a return statement into execution to the effect of:

```
IF dongleUID[] is PRESENT
    THEN return 1;
ELSE return 0;
```

Such Boolean return statements are easily

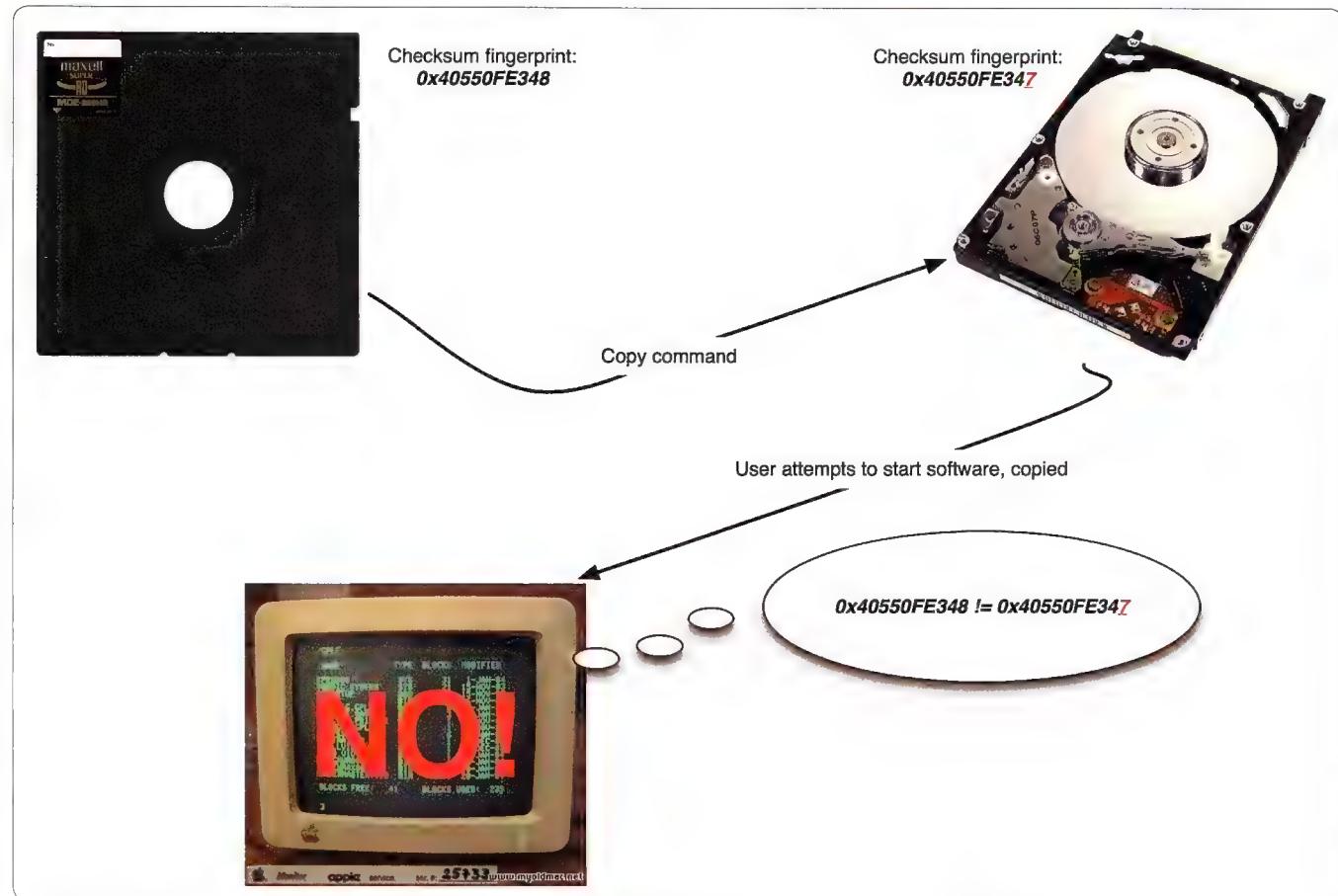
cracked by inserting spurious code on the localhost, or target machine.

Dongles have become more intelligent however, with cryptographic sums, crypto processors, hardware drivers and real time clocks (RTC) being employed. Interestingly, the dongle was the precursor to a whole line of new protection technologies to follow that, without the dongle, probably would never have existed.

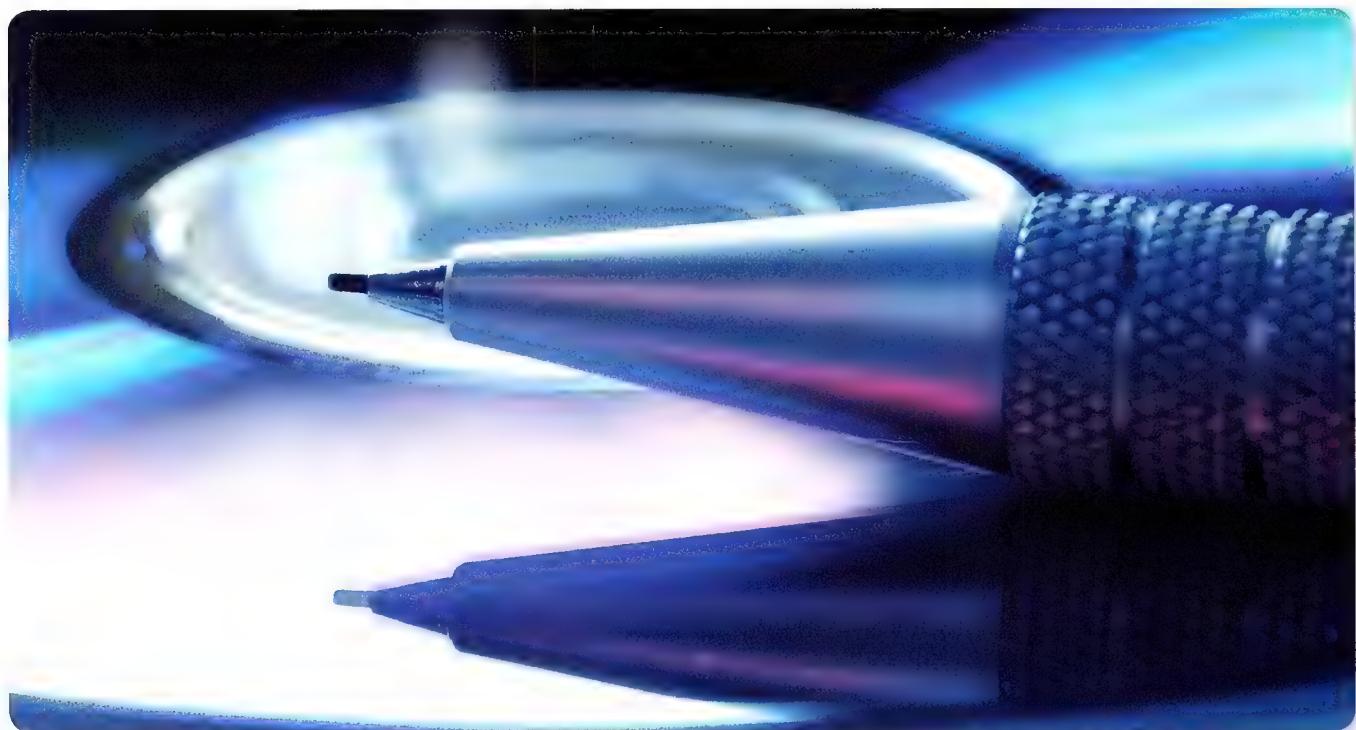
## The hardware checksum

By the mid to late 1980s dongles were being beaten, and the software checksum was a bit of a joke. Somebody got the idea that a global hardware level checksum might be a useful mechanism in slowing down the rapid growth of piracy. The idea was simple. Take a big bit of hardware, that has some known components and give each component some kind of 'signature' or assigned value. That value would then be added to the rest of the components in the host, to form the global checksum for the device, theoretically increasing security.

When hardware piracy and the modifications being used to defeat software checks in hardware became apparent, the use of the global checksum came into its own. The global sum, if interrupted by a newly introduced component or unauthorised part, would fail, potentially rejecting the user from running a certain type of software or proprietary code.



The simplest form of piracy protection in existence, the use of a checksum.



For those following closely, the Xbox 360 and PlayStation 3 both use a hardware level checksum across their components. Logically, the introduction of mod chips into the consoles has been difficult, as a result. Mess with the hardware, and you're messing with the software.

## The naughty 90s

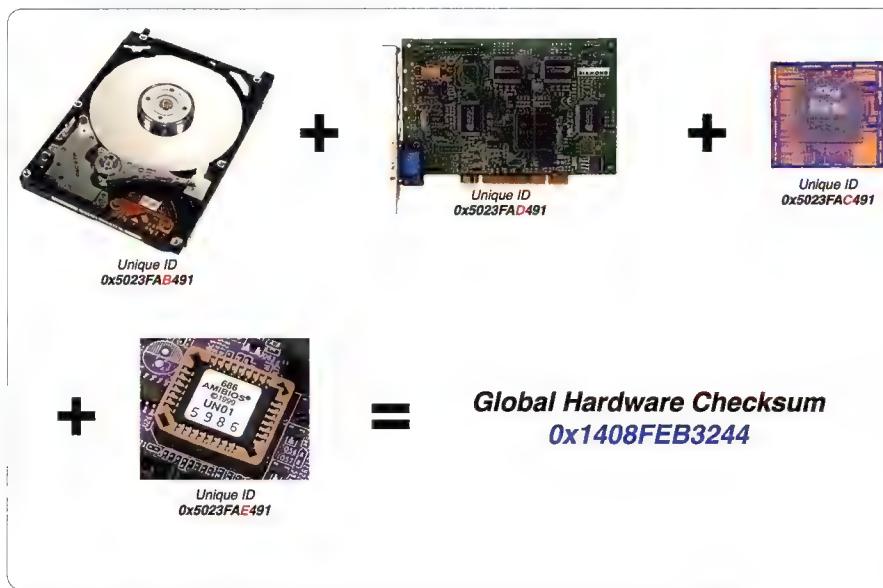
Permutations of existing techniques were coming thick and fast. Ever more vendors shipped ever increasingly convoluted solutions using dongles, keys, checksums and validation methods. With the advent of the Internet and popularisation of network-connected computers,

challenge and response codes became popular. A user would receive their software in a box with an activation key on it. They would install the software, and then the software would ask for a validation code. The end user would put their activation key in and a validation key would come back from the software vendor server. This would then be input into the software – and

provided it 'matched up' on both sides, the product would be activated.

This gave rise to the ever-popular keygen. Key generators became popular when the power of decompilation tools (and thus, reverse engineering) became accessible to those outside of large-scale software development teams. The premise of the keygen was simple; pull apart the

**Once this information is obtained, simply put it into software that can run externally to the application, and generate a new key...**



The concept of the global hardware checksum, where each component contributes to a known stored 'magic number'.

proprietary code by disassembling it into near-machine code, then figure out what sequences of keys or algorithms were used to create said keys. Once this information is obtained, simply put it into software that can run externally to the application, and generate a new key based upon the algorithm.

Key generators today represent the largest 'market' for open piracy, often being created for everything from games to applications and operating systems. For many of the groups and individuals that make key generators, it's all about the challenge of the reverse engineering method and technique, rather than simply stealing software.

## Of deformities and wobble sectors

Along the time line, it's now early turn of the century. Software companies are under threat, people are losing jobs, and the industry is under a slow but definite landslide. Here is where the

# BIOSHOCK 2

Available 9th February, 2010

[www.BioShock2game.com](http://www.BioShock2game.com)



Strong horror themes,  
violence and coarse  
language. Gaming  
experience may  
change online.  
REstricted



PS3  
PlayStation 3

XBOX 360

XBOX  
LIVE

Games for Windows

2K  
GAMES

© 2002-2009 Take-Two Interactive Software and its subsidiaries. Developed by 2K Marin, 2K Australia, 2K China and Digital Extremes. BioShock 2K Games, 2K Marin, 2K Australia, 2K China, the 2K Games logo, the 2K Marin logo, the 2K Australia logo, the 2K China logo and Take-Two Interactive Software are all trademarks and/or registered trademarks of Take-Two Interactive Software, Inc. Digital Extremes and its logo are trademarks of Digital Extremes. Microsoft, Windows, the Windows Vista Start button, Xbox, Xbox 360, Xbox LIVE, and the Xbox logo are trademarks of the Microsoft group of companies, and "Games for Windows" and the Windows Vista Start button logo are used under license from Microsoft. "PlayStation", "PLAYSTATION" and "PS" Family logo are registered trademarks of Sony Computer Entertainment Inc. All other marks and trademarks are the property of their respective owners. All rights reserved.

'fun' stopped and things became serious.

The RedBook CD standard was well in place for audio CDs, as were the respective standards for data DVDs. It became painfully apparent that it wasn't a problem for people with the right equipment to 1:1 copy media, no questions asked. The vendors had an ace up their sleeves, though. Along came SafeDisc.

Command and Conquer: Red Alert 2 started the trend. The disc would copy fine. Everything seemed sensible. It would then be installed from, and everything still seemed sane. Then the problems would arise. People couldn't play from their backup burnt media. Was the burner missing something? It sure was!

Weak sector and Eight to Fourteen Modulation (EFM) encoding were the key to the protection mechanism in Macrovision's SafeDisc.

First, the concept of the 'exclusive or' (XOR) needs to be understood. XOR is a bitwise operation. XORing a number with 1 flips a bit, but XORing with 0 does not. If your input bit reading from a disk was 1, and it was XORed with 1, the result would be 0. If your input bit was 1, and it was XORed with 0, the result would be 1.

The next part of the equation comes in understanding of how a CD/DVD drive actually works. A laser in the most modern of drives still finds it hard to detect frequent changes between physical pits and lands. As a result, changing the number of pits and lands frequently is a recipe for failure. In this respect, when reading/



Pit-Pit-Pit-Land-Land-Land-Pit-Pit-Land-Land-Land-Land.

Here, the sequence of pits to lands would be +6, -7.

Here is where SafeDisc and several other copy protection techniques kick in. SafeDisc's weak sectors are already XORed with the verified outputs of what a sector XOR engine will be. Once this hits the EFM encoder on the way 'in', because it's already XOR'ed, it'll be twice the pattern that it was previously, and thus have to traverse twice the length on read 'in' or write 'out'. The algorithm used for calculating

companies have had to try harder on numerous fronts. Proprietary media, barcode data (BD+ watermarks on Blu-Ray media) and low-level hand shaking are all part of the game.

At the stream level, High Bandwidth Digital Content Protection (HDCP) is stopping direct packet ripping in its tracks on the consumer set-top front by creating a handshake tunnel using a 56-bit key and a small stream cipher consisting of up to 20 permutations for each device. This can be thought of as analogous to an SSH tunnel between two UNIX hosts, but made purely for pixels and sound.

The most modern copy protection techniques use a combination of:

- Weak sector/media signature identification (SafeDisc et al).
- Global hardware checksums.
- One-time keys and activation techniques.
- Software enclosed environments.

In an abridged sense, we arrive at this point, where the hypervisor is born.

The hypervisor, used by many digitally sensitive modern environments such as the PlayStation 3, BD-ROM drives and large scale server platforms (VMware VSphere, Linux KVM et al), is a method for encasing a running set of known routines, in which software will work – guiding direct hardware level access. Without the instructions the hypervisor can provide, and effectively 'useless' hardware underneath, the end user has no choice but to run through the provided mechanism.

When the user runs through this mechanism, they play by the hypervisor's rules. The PlayStation 3's content protection remains unbroken, to this day, proving that total control over hardware, software and middleware is an ideal means to plug the piracy hole.

Software engineering, hardware engineering and protection development are all lucrative pockets in which to dwell. In a world where e-protection needs must continue to grow, digital content protection is only going to become more important. Wouldn't you rather play for the good guys, than the bad?

## A laser in the most modern of drives still finds it hard to detect frequent changes between physical pits and lands.

writing a CD or DVD, the number of these pit/land changes must be minimised. This is where EFM was invented. It turned eight bits into 14 bits, with an XOR lookup table alongside, as a hardware encoder/decoder.

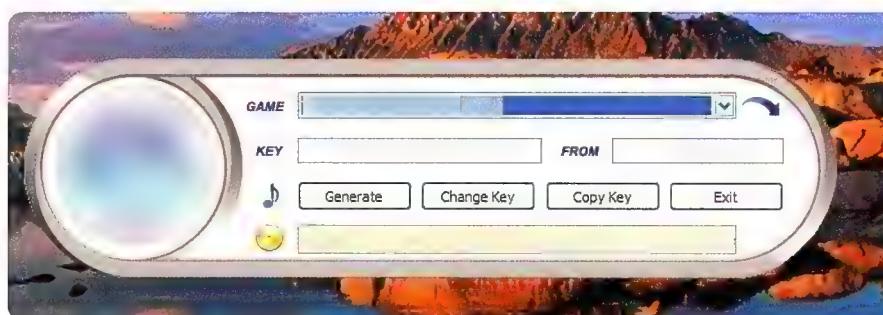
The next step in understanding SafeDisc is the Digital Sum Value (DSV).

The DSV is an integer that changes at each point along the media. For every pit on the disc, the DSV is incremented by one, and for every land it is decremented by one. For instance, take the following series of pits and lands:

these merged bit patterns is far too intensive and slow for a burner to deal with. When confronted with these long chains of weak sectors a drive doesn't know what to do, so it throws the read away as garbage data or a read error. When this happens, the SafeDisc module gets the hint, understands that the media is forged, and refuses to run, ruining the disc in the process.

### Hyperstrong

So, with SafeDisc emulated, broken and forged by tools such as Daemon Tools, the



Typical professional release group keygen, often associated with really groovy retro MIDI tunes.

# CENTURION 5 II

## THE LEGEND IS BACK

The all new Centurion 5 II has been vastly improved from the inside. This mid-tower chassis is designed with increased drive bay capacity, more airflow thanks to the enhanced ventilation and fan options and easy-to-install features.

This is a multi-purpose chassis that you cannot go wrong with.



Bottom PSU placement



1.8"/ 2.5" HDD adapter



CPU retaining hole



Airflow improvement

### Premium Resellers

<b>VIC</b>	Computers & Parts Land	03 8542 8688	<a href="http://www.cpl.net.au">www.cpl.net.au</a>
	Centre Com	1300 007 600	<a href="http://www.centrecom.com.au">www.centrecom.com.au</a>
	MSY Technology Pty. Ltd.	03 9560 2288	<a href="http://www.msyst.com.au">www.msyst.com.au</a>
	Scorpion Technology	1300 726 770	<a href="http://www.scortec.com.au">www.scortec.com.au</a>

### NSW

ARC Computer	02 9748 8322	<a href="http://www.arc.com.au">www.arc.com.au</a>
Aus PC Market	02 9646 8088	<a href="http://www.auspcmarket.com.au">www.auspcmarket.com.au</a>
Capitol Computer	02 9281 8890	<a href="http://www.capitolcomputer.com.au">www.capitolcomputer.com.au</a>
Tech Buy	02 9648 1818	<a href="http://www.techbuy.com.au">www.techbuy.com.au</a>
MSY Technology	02 9648 4116	<a href="http://www.msyst.com.au">www.msyst.com.au</a>

### SA

Adrenalin Computers & Software	08 8410 0777	<a href="http://www.adrenalin.net.au">www.adrenalin.net.au</a>
IT4US Computers & Media	08 8231 7588	<a href="http://www.itforus.com.au">www.itforus.com.au</a>

### QLD

Computer Alliance	07 3421 3200	<a href="http://www.computeralliance.com.au">www.computeralliance.com.au</a>
Game Dude Computers	07 3387 1500	<a href="http://www.gamedude.com.au">www.gamedude.com.au</a>
MSY Technology	07 3217 9070	<a href="http://www.msyst.com.au">www.msyst.com.au</a>
Umart Online	07 3369 3928	<a href="http://www.umart.com.au">www.umart.com.au</a>

### WA

Austin Computers	08 9201 2788	<a href="http://www.austin.net.au/index.asp">www.austin.net.au/index.asp</a>
MSY Technology	08 9344 1002	<a href="http://www.msyst.com.au">www.msyst.com.au</a>
YNOT Computer Systems	08 9330 7666	<a href="http://www.ynots.net.au">www.ynots.net.au</a>
Netplus Micro Computers	08 9242 7288	<a href="http://www.netplus.com.au">www.netplus.com.au</a>

# INPUTOUTPUT

Dan Rutter brings the answers to your questions like no-one else can.

## I/O OF THE MONTH

### Atomicans vs Batteries, Part XXXII

**I** know you've covered the slow death of laptop batteries in detail before, but I'm curious what would cause them to die very quickly. I had a good two-year run with the original battery for my laptop, but then I got an eBay cheapie.

I knew it probably wasn't going to last as long, but after only 5 months it started to lose capacity quite dramatically. Within the space of about a week it went from taking a 100% charge down to only about 10%, hardly enough for me to even shut down the laptop if the mains failed. The dealer actually honoured their 1-year guarantee, but the replacement didn't fare much better; only getting 6 months of use before it, too, died a quick death.

What would cause this rapid decline in capacity? I know non-genuine battery packs probably don't use cells of the same quality as OEM but I don't understand why they'd go from 100 per cent to zero so fast.

Michael Shannon

**O** I can't give you a really confident answer to this question; as you say, there are a few possibilities.

In decreasing order of probability, I'd say:

- 1:** The cells in the battery were old when you bought it.

Lithium-ion cells used to commonly crap out only a couple of years after they were



WINS A  
THERMALTAKE  
EVO BLUE  
750WATT  
POWER SUPPLY

manufactured (though even then, a very few Li-ion cells lasted much longer). Today, they're likely to last better, but still not nearly as long as, say, NiCd or NiMH cells.

If you buy a 'new' battery that's been on the shelf for a couple of years - entirely possible, if you've got an older-model laptop, or one that uses the same battery type as older units - that battery may have a very disappointingly brief life, and the loss of capacity over time may be as dramatic as you've experienced.

It's also possible for a brand-new battery to be assembled out of cells that've been on the shelf for a couple of years, with the same result.

Lithium-ion cells also age faster when it's warmer. Laptops frequently bake them into an early grave, and the hotter the weather, the worse the problem.

For optimal shelf life, store lithium-ion batteries at 15°C and 40 per cent charge. Have your butler charge them very carefully, and then gently place them in your battery humidior.

**2:** The battery's still okay, but the charge-monitoring hardware is deranged, and won't let the battery discharge, or charge, fully. This is what's happening when someone reckons 'cycling' a lithium-ion battery brought it back to health. If discharging as far as it'll let you and then recharging doesn't help (and that's not something you should otherwise do, as lithium-ion prefers frequent shallow discharging), then there's nothing more you can do.

**3:** Some lower-level problem, like the laptop's charging circuit isn't working properly.

**4:** Something really off-the-wall, like crud on the battery contacts.



### Cable origami

**I**n my line of work I install copper and optic fibre cabling that has varying levels of minimum bend radius. The copper networks (Cat-5, Cat-6) usually get a performance hit against them if the bend radius is not met, or the cable gets kinked a few times during installation.

Do typical PC cables, like SATA and IDE cable, suffer a performance hit or slowdown if I bend them too tightly in trying to get a really neat case install?

Chris Kamppi

**O** Yes, there are minimum permitted bend radii for internal PC data cables. Bend them too sharply and you can damage them. I wrote about this in a letters column a while ago:

[www.dansdata.com/io082.htm#4](http://www.dansdata.com/io082.htm#4)

If you're lucky, an excessively sharp bend will fracture a data conductor and stop the

And now, I shall make a crane sitting on a chrysanthemum.



cable from working at all. If you're not lucky, you can end up with a dodgy cable that throws data on the floor from time to time. Then error-detection in the various protocol levels involved in moving data to and from drives *usually* copes with the problem, and just gives you a somewhat slower drive than you'd otherwise have. But every now and then, some bad data will get through, and cause crashes or subtly munged files.

(I wrote a bit about this in [www.dansdata.com/rcables.htm](http://www.dansdata.com/rcables.htm), about over-long and 'rounded' PATA cables, in the distant past when we didn't yet have the retronym 'PATA'.)

Ribbon cables are a special case, when it comes to bend-radius limits. They don't really bend at all in one direction, but they bend really well the other way, and, as you say, often have quite sharp creases folded into them to get them to neatly turn a corner. They demonstrably usually work fine like that, though the definition of 'fine' may include "wound down to some awful PIO transfer mode by Windows to make the errors stop".

Exactly how sharp is too sharp depends on who you ask. Real Army-uniform razor creases are definitely asking for trouble, but it's easy to find recommendations that go *far* the other way.

According to NASA, for instance...

[tinyurl.com/YLRHAB5](http://tinyurl.com/YLRHAB5)

...permanent bends in ribbon cable should not have a radius smaller than TEN diameters of the individual wires, including the insulation.

Standard 40-conductor PATA cable has wires a little less than a millimetre in diameter, so the NASA spec dictates quite a large radius; the bend's diameter will have to be about the same as that of a five-cent piece.

80-wire ATA cables - which have the same actual signal wires, but with earths interleaved between all of the signal wires to reduce interference at Ultra ATA/66 data rates - have wires only about half a millimetre in diameter, so the NASA spec for those gives a bend diameter about that of a pen. (But the bend in the connector's own strain relief is, on the same NASA page, obviously rather tighter!)

The NASA spec tries to make the cable work just as well bent as it does flat, even for extremely high bandwidth and/or great lengths of cable. An 18-inch PATA cable connecting a UDMA/33 DVD burner in a PC doesn't need to be treated this carefully. (And you could probably grind a 34-wire floppy cable in a mortar and pestle and still have it work.)

So, as ribbon cables fade out of the PC scene, I suggest you just refrain from putting *sharp* creases in them, or in SATA or even power cables, for that matter. Fold cables as gently as is possible to achieve the routing you need, or just hook 'em in place with cable clips or gently-applied zip-ties. Don't crush folds flat just to stop a cable drooping a bit. And remember that if a drive seems to be going weird, a creased cable may be the cause.

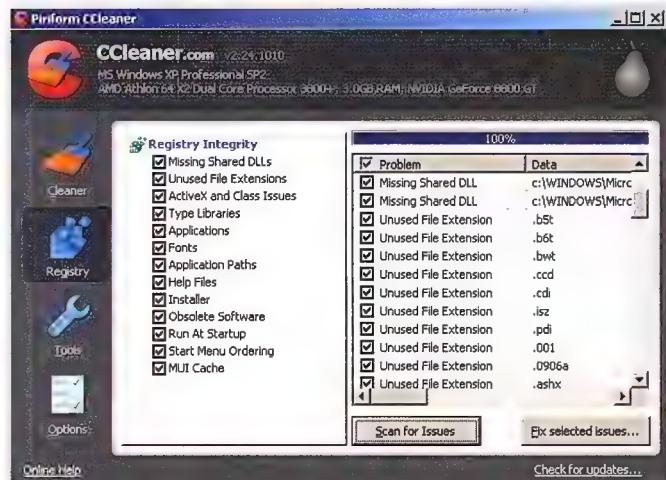
## Always wax your registry after cleaning it

 Are registry cleaners worthwhile?  
I don't mean those ones with the pop-up ads that tell you your computer will be 2743X faster if you clean all the Satan out, like those fake antivirus ads. But I use Crap Cleaner to get rid of temp files and stuff, and it's got a registry cleaner option, and that never seems to have hurt anything.

But did it do any good? What's really the point of these things?

Sam Groom

 The Windows registry is a giant pile of software settings, for the operating system itself and for most of the applications on it. You name a configuration change in your computer – including minor automatic updates – and it'll at least change a registry key somewhere, and probably add some new ones. But when configuration changes remove something, they usually don't mop up all the registry changes that thing made.



Registry cleaners certainly **LOOK** as if they do something useful...

Enter the registry cleaner. It whips through all of the many tens of thousands – or *hundreds* of thousands – of registry entries, and looks for all of the things that don't seem to be needed any more.

Pointers to old versions of files that've been replaced by newer ones, and then deleted. File extensions that something took note of, but which you've never associated with an application. Settings for software you've uninstalled. Breadcrumb-trails about files that some installer used, but then deleted.

And then the registry cleaner deletes all those things. (After showing you a giant list of stuff that you don't know what it is, and asking you if it's all right to get rid of it all.)

And then, almost always, everything is perfectly fine. As a general rule, none of the 'reputable' registry cleaners, like the one in Crap Cleaner (which was delicately renamed "CCleaner" a while ago), ever do any harm. Heck, you can still run a 1997 version of Microsoft's own RegClean on Windows 7, and I don't *think* it'll trash anything. I've run registry cleaners umpteen times over the years, and I can't remember one ever making a computer any worse than it was already.

But that doesn't mean that all of this is actually worthwhile. The steadily-growing registry was one of the many things that all worked together to force people to keep reinstalling Win98, but every Windows version since then (let us not speak of Windows ME) has had a whole different registry system, in which the size of the registry has close to zero impact on anything. Software does not have to spool through the registry from the beginning, searching for the entries that apply to it. The only thing that really takes longer, today, if your registry is gigantic and full of meaningless cruft is... backing up the registry.

It does take up more space, but now that an utterly Gargantuan one-gigabyte registry only occupies about ten cents worth of disk, who cares?

A more worthwhile kind of registry cleaner is the one that's part of anti-malware software, and tries to weed out the poisonous tendrils of the ever-more-devious crapware foisted upon the Windows world by diseased minds. But that sort of registry scrubber expressly *isn't* looking for entries that aren't connected to anything any more. It's looking for unholy Gordian knots of nonsense-named cloaked programs that all try to guard one another from the extermination they, like their authors, richly deserve.

I think unnecessary registry cleaners may have gotten a boost from Vista, because Microsoft really outdid themselves there. An old WinXP system's registry might be 25Mb in size; an unremarkable Vista box's registry can easily be 400Mb.

But no registry cleaner ever makes a normal registry all that much smaller. Actual miraculous improvements from just cleaning cruft out of the registry are only found in the glowing reviews on [get-your-honest-reg-cleaner-reviews-here.com](http://get-your-honest-reg-cleaner-reviews-here.com), whereupon are then promoted umpteen dodgy registry cleaners, all with get-rich-quick affiliate programs... 

# SCORPION TECHNOLOGY COMPUTERS



## VENOM GOLD

Intel Core i7 950 3.00GHz  
X58 Chipset, Blu-Ray  
6GB 1333MHz DDR3  
2 x 1TB HDD, 750W PSU  
PowerColor HD 5850, 1GB  
Windows 7 Home Premium

**\$2559**



## VENOM SILVER

Intel Core i7 920 2.66GHz  
X58 Chipset, Blu-Ray  
3GB 1333MHz DDR3  
1TB HDD, 650W PSU  
PowerColor HD 5770, 1GB  
Windows 7 Home Premium

**\$1779**



## STINGER

Intel Core i7 975 3.33GHz  
**GIGABYTE** X58 Chipset  
12GB 1600MHz DDR3  
60GB SSD, 2x 1TB HDD  
eVGA GTX295 1792MB, 850W  
Blu-Ray Burner, Windows 7 Pro

**\$4770**



## REDBACK GOLD

Intel Core i7 860 2.80GHz  
**GIGABYTE** P55 Chipset  
4GB 1333MHz DDR3  
1TB SATAII HDD, 7200rpm  
PowerColor HD 5750, 1GB  
Antec Two Hundred, 750W

**\$1325**

+ \$40 HD 5770 1GB  
+ \$150 HD 5850 1GB  
+ \$350 Core i7 870



## REDBACK SILVER

Intel Core i5 750 2.66GHz  
**GIGABYTE** P55 Chipset  
2GB 1333MHz DDR3  
640GB SATAII HDD, 7200rpm  
Gigabyte 9800GT, 512MB  
Antec Two Hundred, 550W

**\$1039**

+ \$20 1TB HDD  
+ \$40 HD5750 1GB  
+ \$50 4GB Memory



## MANTIS HTPC

AMD Phenom II  
955 (3.20GHz)  
2GB 800MHz DDR2  
1TB HDD 7200rpm  
Gigabyte HD4550  
Blu-Ray Reader  
460W Quiet PSU

**\$1385**



Digital TV Tuner  
Antec Fusion Case  
MCE Remote Included



## HORNET GOLD

Core 2 Quad Q8400 2.66GHz  
Asus P43 Chipset  
2GB 800MHz DDR2  
500GB SATAII HDD, 7200rpm  
Gigabyte HD4650, 1GB  
Centurion 5 Case, 460W PSU

**\$759**

+ \$30 Core 2 Quad Q9400  
+ \$45 4GB Memory  
+ \$75 Radeon HD 4770



## HORNET SILVER

Core 2 Duo E7500 2.93GHz  
**GIGABYTE** G41 Chipset  
2GB 800MHz DDR2  
320GB SATAII HDD, 7200rpm  
Intel X4500 Graphics  
Centurion 5 Case, 460W PSU

**\$559**

+ \$15 500GB HDD  
+ \$60 4GB Memory  
+ \$65 Core 2 Quad Q8400



## BEETLE

Pentium Dual E5300 2.6GHz  
**GIGABYTE** G41 Chipset  
2GB 800MHz DDR2  
160GB HDD, 420W PSU  
Intel X4500 Graphics  
Coolermaster Elite Case

**\$439**

+ \$4 320GB HDD  
+ \$60 4GB Memory  
+ \$60 Core 2 Duo E7500



Purchase any ScorpTec System  
featuring Windows® 7 and  
receive a FREE 4GB USB Stick\*

Enter Promo Code **ATOMWIN7** to redeem online

Featuring Windows 7.  
Your PC, simplified.



Featuring Windows 7 Professional.  
Your PC, simplified.



[WWW.SCORPTEC.COM.AU](http://WWW.SCORPTEC.COM.AU) (EST 1998)

AUSTRALIA WIDE DELIVERY, 1300-726-770

All Prices are based on Cash only and include GST

2% Visa/MasterCard/Bankcard, 4% Amex/Diners Surcharge applies

Direct Deposit Banking Details: BSB: 033-385 / ACC: 212477

Pricing subject to change. Errors and Omissions Excepted

All Rights and Trademarks are property of their respective owners.

\* Strictly valid whilst stocks last. Not valid with any other discount/offer.



CLAYTON STORE  
Unit 4-5/2, Garden Road  
Clayton, VIC 3168  
P: (03) 8561-3200  
F: (03) 9561-1688  
sales@scorptec.com.au  
Mon-Fri: 10.00am - 6.00pm  
Saturday: 10.00am - 3.00pm

ROWVILLE STORE  
1/899 Wellington Road  
Rowville, VIC 3178  
P: 9764-3222 F: 9764-3111  
rowville@scorptec.com.au  
Mon-Wed: 10.00am - 6.00pm  
Thur-Fri: 10.00am - 7.00pm  
Saturday: 10.00am - 3.30pm





# The instant on

We want our machine on, and we want it now.

Everyone's mad about boot speed at the moment. Microsoft touted the faster boot up (and shutdown) of Windows 7 compared to Vista. Canonical made it quite public that Ubuntu 9.10 booted considerably faster than 9.04, not to mention Vista as well. And when Google made the beta of its Chrome OS public, one of the major listed features was a boot up time measured in single-digit seconds.

We've spent over a decade now not really bothered too much about boot times – well

the moment you need it.

But not computers. You can argue that they are more complex devices, and do more work, but that's just thinking backwards. If you settle for that, nothing improves.

Appliances are supposed to be tools that just work, which isn't the case when a PC is trundling away booting up. In that state it's useless to you, and is wasting your time. And it's not just that we as humans aren't gifted with large volumes of patience, although that

Ubuntu distributions have more than halved boot up times from just a year ago. On my machine, the OS boots up in 21 seconds. And that's with just trusty old rotating platters; SSDs would reduce it further.

Google's Chrome OS boots in a remarkable four seconds in a virtual machine on this same system. The idea that computers just take time to boot up is not a default, status-quo, or law of computing. It's just a habit of the past you're accustomed to. And one that's finally changing. 

Ashton Mills has a pretty speedy boot time himself.

[amills@atomicmpc.com.au](mailto:amills@atomicmpc.com.au)

## All of these appliances are instantly available to you. You don't have to wait for a toaster to boot up, or a fridge to load.

some of us have cared, namely those that read magazines like the golden tome you hold in your hands – but for developers behind the operating systems we use it's never been much of a focus.

Until now where, all of a sudden, it's become the hallmark of a good or bad OS.

And this is partly because, for so long now, that's just what computers do. They take time to boot up. But who says it has to be that way? The vision for personal computers way back in the technological dark ages was for having these wonderful marvels of the modern world as appliances in the home. Just like your toaster or kettle or dishwasher.

And all of these appliances, every one, are instantly available to you. You don't have to wait for a toaster to boot up, or a fridge to load. Your kettle doesn't ask you to wait before you tell it to boil water, your microwave doesn't display a whirling Windows logo before you can nuke your pie. Every appliance you have is ready for you at

certainly doesn't help. It's simply that your time is more valuable than that, and as a tool your PC should be ready go before your butt has even settled into the chair.

Which is no doubt one of the instigators for a few motherboard vendors who have now begun bundling in an instant-on operating system for basic tasks. ASUS' Express Gate, for example, is an embedded Linux operating system described quite literally as for "when you want to surf the internet without waiting for your PC to turn on".

Apt, no?

It's a reflection of where we're going now: PCs are ubiquitous, they do – on the whole – work as intended, and they are affordable. So now the next step is to improve the experience of using them.

While booting a 'full' Windows or Linux still takes time, this too has come under scrutiny. Windows 7 and, to a greater degree, the latest





# Build a Budget Monster

Despite what the console fanboys tell you, PC gaming doesn't have to cost the earth. **Mark Mackay** shows you how to put together a killer gaming rig or a media creation powerhouse for around \$900!

If you've ever braved one of those PCs versus consoles debates on an online forum (like ours, perhaps), then you'll be weary familiar with the tiresome argument that gaming PCs are just so much more expensive than the misleadingly cheap consoles. This is, of course, nonsense, and we can prove it.

There's simply no reason why you should have to settle for sub-par graphics, overpriced games, limited multiplayer capabilities and ludicrously priced add-ons. We're going to show you how to construct a gaming PC that's not only ready to chuck out killer frame rates, but will also have room for future upgrades so that you can ensure your gaming experience evolves with the times.

Of course, not everyone wants to build a PC just for gaming, so we've also built a media-editing rig that will crunch through video-encoding tasks, and we'll show you where you should focus your budget for your own priorities.

# Section 1: Inside the gaming rig

## THE CASE

### SilverStone PS02, \$70

While there are plenty of dodgy products in the various subsectors of the PC industry, the chassis market appears to be particularly awash with them. That's not to say there are no genuine bargains out there, and the SilverStone PS02 is one such gem. It ships with a single 120mm exhaust fan at the rear, another 120mm fan mount at the front and one more in the roof. This makes it an ideal starting point for a budget gaming PC, as any heat from future upgrades can be shifted by adding another fan or two. This is a particularly important consideration when selecting a budget gaming rig chassis, as you want to keep pace with future upgrades. There's also plenty of space inside this case to build a neatly cabled PC with lots of airflow.

## THE PSU

### Corsair CX400W, \$85

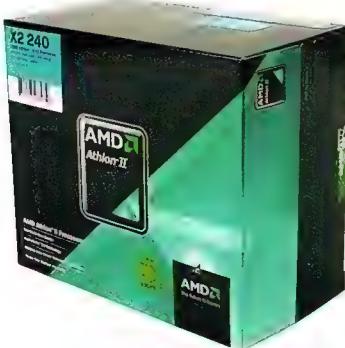
Here at Atomic we're firm believers in always using a power supply you can trust, even if you're on a tight budget. As a prime example, Corsair's CX400W was the cheapest power supply to manage 100 per cent stability in this issue's H2H. It might not have any fancy extras, but it more than makes up for this with its price-to-performance ratio, making it the ideal candidate for a budget PC. Even when pushed to the hilt, the CX400W maintained 84 per cent power efficiency. The fan may not be the quietest in the world under full load, and you'll have to manage without modular cables but, much like the Millennium Falcon, the CX400W has it where it counts.

## THE PROCESSOR

### AMD ATHLON II X2 240, \$70

It was only a few years ago that AMD's Athlon 64 CPUs were regularly humiliating Intel's Pentium 4 CPUs in speed tests. Since then, however, Intel has rained enthusiastically on

AMD's parade with its Core 2 CPUs, but AMD has now reinstated the Athlon brand with a few new tricks under the heatspreader. Put simply, the Athlon



II has far more in common with the Phenom II than the original Athlon architecture, but it lacks some of the features such as the shared pool of Level 3 cache.

New Athlon IIs also feature just 128KB of Level 1 cache and 1MB of Level 2 cache per core, but it makes up for the meagre cache quantities with its hefty clock speeds. After all, a pair of cores running at 2.8GHz was previously unheard of for under \$100, and you can get more than 3.0GHz from it too. Overclocking is fun at the best of times, but starting off with a budget chip such as this is when it really comes into its own. We expect to see this chip hit around 3.5GHz after we've worked our magic, which will make it a real bargain.

## THE COOLER

### Arctic Cooling Freezer 64 Pro PWM, \$30

Arctic Cooling's gracefully ageing Freezer 64 Pro may have been doing the rounds for several years, but it's still a very effective and quiet cooler for the money. It produces average temperatures for an aftermarket model, but as our new Athlon II is fabricated on a 45nm process, the bargain Freezer 64 Pro should be able to deal with the worst of the excess heat produced from overclocking. What's more, with the addition of PWM speed control for the fan, the Freezer 64 Pro will be as easy on your ears as it is on your wallet.



## THE MOTHERBOARD

### MSI 770-C45, \$70

Finding a decent motherboard for less than \$100 can be tough, but the MSI 770-C45 has everything the budget-conscious enthusiast needs. Based on AMD's 770 chipset, the motherboard can only accommodate a single PCI-E graphics card, but it's generously kitted out with plenty of I/O ports and six RAID-capable SATA 3Gb/sec ports.

The MSI's most endearing quality, though, is its overclocking headroom. We hadn't had much luck with overclocking AMD 770-based boards before the 770-C45 came along, but this board overclocks like a beast, and it's even capable of running the HTT (HyperTransport) bus at 260MHz. Once again, when you're on a tight budget, you'll get better value if you

sacrifice surplus features, such as additional PCI-E slots, in favour of performance.

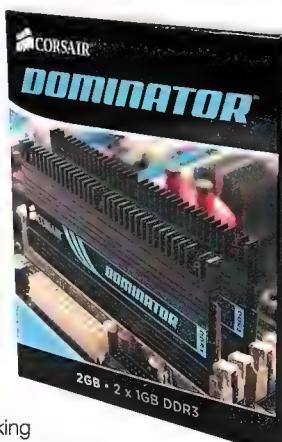
The other major factor to consider when choosing a motherboard is the CPU socket, and this board has AMD's latest AM3 socket. While we love Intel's LGA775 socket dearly, and will always remember the good times we had overclocking the pants off our Core 2 chips, the long-lived socket's days are now numbered. Conversely, AM3 has a decent future ahead of it, so this board gives you the option of upgrading to one of AMD's triple- or quad-core Phenom II chips in the future if and when you have more money to spend.



## THE MEMORY

### Corsair Dominator TW3X2G1600C9D, \$85

Corsair earned a place in the history books by inventing a memory heatsink that wasn't just a slap-on bit of bling. Not only does its comb-shaped Dominator heatsink look great, it also cools the memory effectively. What's more, Dominator memory is reasonably priced, and consistently stable in our overclocking tests. We chose a 2GB kit of PC3-12800 (1,600MHz) DDR3 Dominator memory, with latency timings of 9-9-9-24. Of course, we could have opted for cheaper memory, but the price difference between Dominator RAM and value memory is currently negligible, and the Dominator's high frequency headroom will help us net a decent overclock with our Athlon II CPU.



## THE GRAPHICS CARD

### 896MB Gainward GeForce GTX 260, \$230

Crysis may have battered even the most expensive graphics cards into submission when it was released in 2007, but with it the hardware requirements of PC games have reached a plateau. As such, now is a great time to buy a graphics card, as you can play most modern games at decent settings without spending the better part of a grand. Furthermore, the recent release of the Radeon HD 5870 has forced



down the price of the older, but still highly capable, graphics cards.

A fine example is this Gainward GTX 260 card, which features 216 stream processors and will ensure that this gaming rig provides plenty of graphical oomph at a very reasonable price. The Gainward is also fitted with a decent aftermarket cooler, which is quieter than the standard GTX 260 stock cooler.

## THE STORAGE

### Samsung SH-D162D and 320GB Seagate Barracuda 7200.11, \$150

Hard disks are insanely cheap these days, and it's incredible that this 320GB Seagate Barracuda drive can be yours for just \$75. That's plenty of storage space for a gaming rig, and you can always add another drive later if you need more space.

While the hard disk is an essential component, its performance is much less important than that of the graphics card when it comes to gaming, so it's a good idea to save some money here and redirect your funds to other areas. For example, you could opt for an SSD instead of a hard disk; but you'd lose the ability to play many games as you'd have to buy a much cheaper graphics card.

Similarly, you don't need to pay any extra for a brand name optical drive either. They all perform the same job, and they're not going

to affect your frame rates. For this reason, we recommend opting for the cheapest optical drive you can find.

For the gaming rig, we've simply opted for an old-school DVD-ROM drive. SATA drives don't cost a lot more and they make cabling slightly neater, so might be worth a look if you have the budget.

## THE OPERATING SYSTEM

### Windows 7 Home Premium, \$110

Microsoft's shiny new OS is the obvious choice for our budget gaming rig, and we highly recommend installing the 64-bit version too. The 64-bit version of the OS will allow your PC to access far more memory, while the 32-bit version can only address 4GB – a figure that includes any memory on your graphics card. Installing 64-bit Windows 7 let you add more RAM without any hassle later on.

# Section 1: Inside the media editing rig

While the media editing rig and the gaming rig share a few components in common, we had to make some adjustments in order to focus the PC's horsepower towards media editing. As such, you can see that there's some repetition between the two PCs, but many of the core components have changed. Here we explain what we've changed and why.

## THE CASE

**Cooler Master Elite RC-330, \$55**



You'll need to opt for costlier core components in a media editing rig, so you'll have to cut some financial corners in order to keep this machine affordable. Opting for a slightly cheaper case is a good place to start, but bear in mind that there are a lot of awful cases in the sub-\$60 bracket. Thankfully, there are one or two gems hidden in this price range, and one such example is the Cooler Master Elite RC-330.

This case has only one 120mm fan but, as with the SilverStone PS02 used in the gaming rig, it's situated just behind where the CPU cooler sits. As media editing is very CPU-intensive, the bulk of the heat in this PC will come from this spot, and the RC-330 will kick it straight out the back. There's also another 120mm fan mount at the front should you want to add another fan. Amazingly, this case also has reasonable build-quality, and all the front blanking panels are backed with dust filters too. This really is a whole lot of case for the cost.

## THE PSU

**Corsair CX400W, \$85**

Here at Atomic we're firm believers in always using a power supply you can trust, even if you're on a tight budget. As a prime example, Corsair's CX400W was the cheapest power supply to manage 100 per cent stability in this issue's H2H. It might not have any fancy extras, but it more than makes up for this with its price-to-performance ratio, making it the ideal candidate for a budget PC. Even when pushed to the hilt, the CX400W maintained 84 per cent power efficiency. The fan may not be the quietest in the world under full load, and you'll have to manage without

modular cables but, much like the Millennium Falcon, the CX400W has it where it counts.

## THE PROCESSOR

**Intel Core i5 750, \$240**

You'll need a far more powerful CPU for a media editing rig as there's a lot of number crunching involved. However, now that Intel's Core 2 CPUs are quickly making their way to the exits, your best bet for this type of PC is Intel's new entry-level Lynnfield chip – the Core i5 750. The CPU has a neat feature called Turbo Boost (rev 2), which automatically overclocks the CPU on the fly when it's under load. As such, this powerhouse of a CPU can beat the Core i7 920 in some performance tests at just its stock settings. Being a Core i5 chip, the 750 doesn't feature Hyper-Threading, but this is a negligible loss when you're getting a very powerful quad-core CPU for your money.

## THE CPU COOLER

**Arctic Cooling Freezer 7 Pro Rev.2, \$37**

Arctic Cooling's Freezer 7 Pro holds a prominent place in our hearts. Back in the Pentium 4 days, Arctic Cooling achieved just the right balance of copper, aluminium and airflow with its Freezer 7 Pro cooler, which provided quiet and powerful cooling at a more than reasonable price.

Now Arctic Cooling has released a new revision of the classic cooler, which not only sports a racy white fan, but more importantly supports LGA1156 CPUs. The cooler features the same fan mounts as its predecessor, suspending the 92mm fan on rubber contacts, which makes for whisper-quiet operation.

## THE MOTHERBOARD

**Gigabyte GA-P55M-UD2, \$135**

Tracking down an affordable motherboard for Intel's new Core i5 and i7 CPUs isn't an easy



job, but Gigabyte's GA-P55M-UD2 manages to pack in all the essentials without costing the earth. Your main priority here is getting the performance you need without forking out for needless extras, and this micro-ATX board based on Intel's P55 chipset fits the bill perfectly. Not only are there two PCI-E graphics slots on this board, but it also features six RAID-capable SATA 3Gb/sec ports, a couple of FireWire ports and plenty of USB 2 ports.

## THE MEMORY

**Corsair Dominator TW3X2G1600C9D, \$85**

Corsair earned a place in the history books by inventing a memory heatsink that wasn't just a slap-on bit of bling. Not only does its comb-shaped Dominator heatsink look great, it also cools the memory effectively. What's more, Dominator memory is reasonably priced, and consistently stable in our overclocking tests. We chose a 2GB kit of PC3-12800 (1,600MHz) DDR3 Dominator memory, with latency timings of 9-9-9-24. Of course, we could have opted for cheaper memory, but the price difference between Dominator RAM and value memory is currently negligible, and the Dominator's high frequency headroom will help us net a decent overclock with our Core i5 750.

## THE GRAPHICS CARD

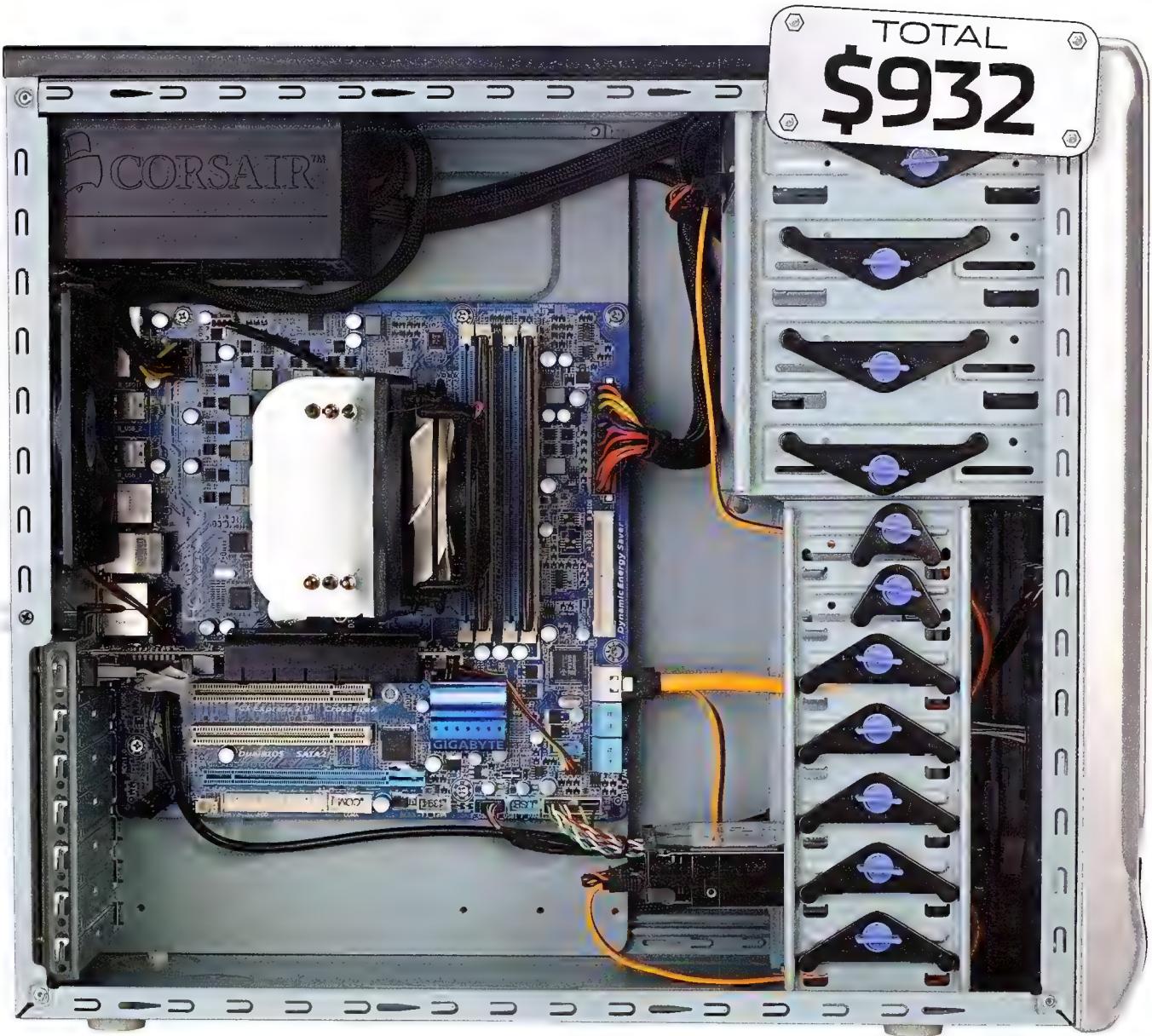
**512MB Sapphire Radeon HD 4350, \$45**

It's a common misconception that watching or working with video on a PC requires a powerful graphics card. While a graphics card with hardware video decoding can improve video playback performance, these features are now commonplace among even the cheapest discrete graphics cards.

What's more, with the exception of a couple of GPGPU-accelerated video encoding apps, most video encoding tasks are still performed entirely by the CPU.

For this reason, you can do your bank account a favour when building a media editing rig and opt for a budget graphics card instead. We've chosen Sapphire's 512MB Radeon HD 4350, as it offers excellent value for money and features a passive cooler. As this budget





GPU won't be getting much of a workout, a passive cooler won't make it sound as if there's a Lancaster practising low-level bombing runs in your PC.

## THE HARD DISK

### 320GB Seagate Barracuda 7200.11, \$75

Hard disks are insanely cheap these days, and it's incredible that this 320GB Seagate Barracuda drive can be yours for just \$75. That's enough storage space to get you started, and you can always add another drive later if you need more space.

## OPTICAL DRIVE

### Samsung SH-S223B, \$65

As this is a media-editing rig, we wanted it to feature a DVD burner rather than the basic ROM drive in the gaming rig. Not everyone wants to burn their movies and data to DVDs these days,

but it's always good to know that you can if you need to. If you're in the habit of making family home videos, for example, then this DVD burner will give you a reliable way of backing up your projects for safekeeping, and you'll also be able to send discs of your movies to your relatives.

## THE OPERATING SYSTEM

### Windows 7 Home Premium, \$110

Microsoft's shiny new OS is the obvious choice for our budget gaming rig, and we highly recommend installing the 64-bit version too. The 64-bit version of the OS will allow your PC to access far more memory, while the 32-bit version can only address 4GB – a figure that includes any memory on your graphics card, and will mean you can only see around 3GB of your system memory.

Installing 64-bit Windows 7 will give you the opportunity to add more RAM without any hassle later on.



# msi™

## BIG BANG

A Beginning Beyond Imagination

### BIG BANG TRINERGY

MSI Big Bang Gaming Series: Through long-standing development and with much energy, MSI formed the state-of-the-art gaming line inspired by the mighty Big Bang. Unique and innovative, the all-new Big Bang series will deliver the shock and awe of unprecedented gaming experience and expand into its own collection of galaxies. This begins the new era of ultimate gaming machines.



NVIDIA 3-Way SLI Ready



100% Server-grade Hi-c Capacitor



Quantum Wave™ Audio Card  
EAX™ ADVANCED HD™ 5.0THX  
TruStudio PC



External OC Dashboard



Copyright © 2009 Micro-Star Int'l Co.,Ltd. All rights reserved.

[au.msi.com](http://au.msi.com)

# Section 2: Building the PCs

There are two emotional stages that you need to progress through when you're about to build a PC. The first is the anticipatory glee when the kit arrives (a novelty that never wears off, no matter how many PCs you build). The second is sheer terror at the thought of having to assemble everything successfully. Don't worry, though, as we're going to take you through the whole process step by step.

## First Steps

Your first step is to install the CPU in the motherboard. For both rigs, start by lifting the retention arm next to the CPU socket and nestling the CPU in place. Both the Core i5 and Athlon II CPUs have a small triangular indicator in one corner. Match this symbol with the corresponding symbol in the corner of the socket and then pull the retention arm down, locking it in place under the latch. To test that the CPU is in position, try to wiggle it a bit. It will stay firmly in place if it's installed correctly. Now head to the appropriate box on the right to see how to fix your CPU cooler.

Next up is the memory installation, which is an easy job. Like many parts in a PC, the memory can only be installed in one orientation so you'd be hard-pressed to mess it up. Just align the small notch in the bottom of the DIMM

### Gaming Rig

The Freezer 64 Pro is a cinch to install. On one side of the cooler you'll find a retention arm, which needs to be in a horizontal position before you start. As with the gaming rig, make sure that the fan is next to the DIMM slots so it will blow air towards the case's rear fan. Now hook the clip on the opposite side of the retention arm onto the mounting bracket that's attached to the motherboard. After that, repeat the process for the clip on the other side of the cooler, and lift up the retention arm to lock the cooler in place.

with the corresponding off-centre bar in the DIMM slot and push firmly on both ends of the module until it clicks into place.

To ensure that the memory is running in dual channel mode, make sure that you use two slots of the same colour.

You can now turn your attention to the case, and make a start by removing both the side panels and putting them to one side. This will make the case lighter and easier to work with. You can now install the motherboard, CPU and cooler assembly that you've just put together. The easiest way to do this is to lay the case flat

### Media Editing Rig

Once the CPU is snug in its socket; it's time to install the cooler. With the Freezer 7 Pro, start by screwing the square mounting bracket to the cooler's body, as illustrated in the manual. After that, place the cooler on the CPU with the fan next to the memory slots so it will blow air towards the case's rear fan.

Once it's in position, open the bag containing the black and white plastic pegs. Start with the four white pegs, inserting them first through the square mounting bracket and then through the four holes at each corner of the LGA1156 socket. Once in place, the cooler will be held loosely in position, and you can then insert the black pegs through the white pegs to lock the cooler firmly in place. Bear in mind that this cooler also comes pre-applied with thermal paste so there's no need to add any more.

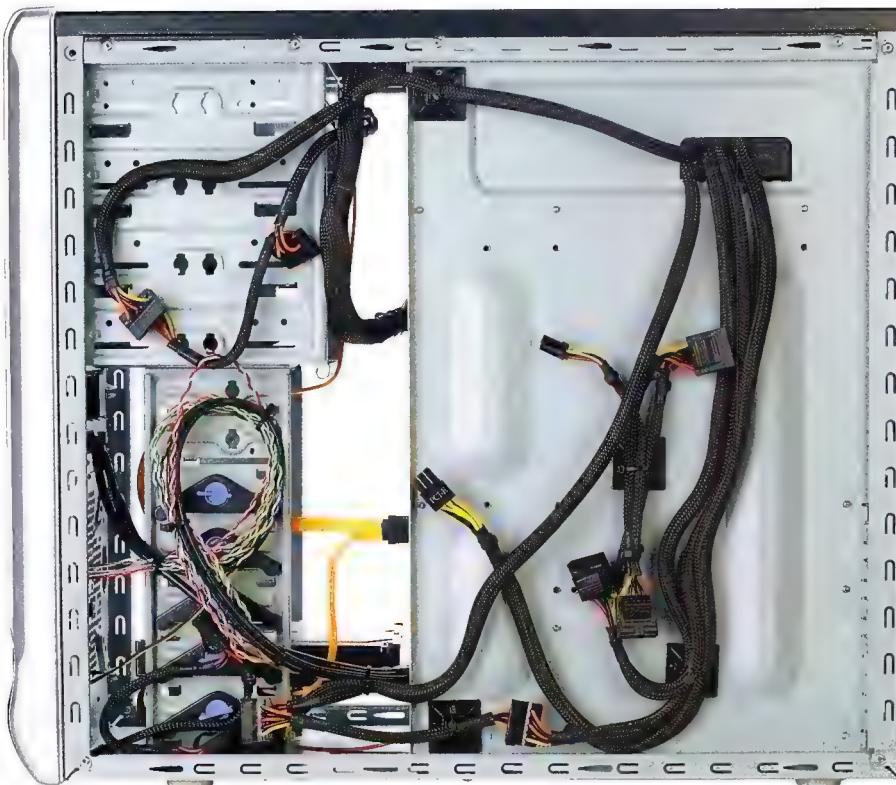
on your desk with the motherboard tray facing up. In the case's accessories box you'll find a number of motherboard stand-offs that look like hexangular bolts with a screw thread protruding from one end. Line up your motherboard with the motherboard tray in the case to see which holes it will occupy and then screw the stand-offs into place.

After that, slot the I/O shield into the back of the chassis. Make sure that it's oriented correctly with the ports on the motherboard, and snap it into place. You can now start screwing the motherboard onto the stand-offs. Screw in all the screws about halfway, and then go around and tighten them up. If you screw them all the way in, the motherboard may have moved off-centre by the time you get to the last screws, which will make them harder to fit.

The final part of this stage is to perform a bit of preliminary cable management. There's no point in adding any more cable mess from the PSU before those that are present have been tidied away.

This gradual approach will make the overall task of tidying the cables less intimidating, and will ultimately make the insides of your PC much neater too.

At this stage, you'll need to sort out the fan cables and the front panel cables. Start by hooking up the power plugs on the fan cables to the power points on your motherboard to get an idea of the length you have to tidy away. After that, find a decent route for the excess length of the cables to travel through without preventing them from reaching their destination. Use cable ties to fix the cables in place, routing them round any part of the case where



You can hide cables on the other side of the chassis behind the motherboard tray. Just keep them as flat as possible so that you can still fit the side panel.



## Simply Fast: The New GIGABYTE P55A-series of Motherboards

The continual improvement of technologies and manufacturing processes has allowed modern PCs to evolve from cumbersome, micro chip-laden platforms with dedicated functionality to high performance, multi-function systems with limited numbers of highly integrated chips. Continuing in this trend, the introduction of the Intel® P55 chipset together with the LGA 1156 Core i7/Core i5 processors delivers advantages such as a smaller footprint with its new 2 chip platform, superfast integrated memory controllers in the processor, lower power consumption and higher performance.

Other exciting new developments include the launch of the media-rich Microsoft® Windows® 7 operating system while industry leaders such as NEC, Marvell and Seagate ready their cutting edge USB 3.0 and SATA Revision 3.0 technologies for accelerated management of media on the new operating system. As the leader in motherboard innovation, GIGABYTE quickly adopted these futuristic technologies with the new P55A-series of motherboards that feature USB 3.0, SATA Revision 3.0 (6Gbps) and a 3x USB power boost – essentially 333 onboard acceleration!

The GIGABYTE P55A-series delivers unparalleled performance with SuperSpeed USB 3.0 technologies from NEC and SATA Revision 3.0 technologies from Marvell mounted directly onboard; this is superior to a makeshift add-on card solution that could create a bottleneck at the PCI-E slot when 2 or more SATA 6Gbps devices are attached to it. GIGABYTE P55A motherboards also provide an unprecedented 3x USB power boost on all USB ports for even the most power hungry USB devices. There are also all the usual technologies from GIGABYTE that include Ultra Durable™ 3, AutoGreen, DES2 and GIGABYTE Smart 6 for easier and smarter PC system performance, power and security management.

### GIGABYTE 333 Onboard Acceleration USB 3.0 – 10x Super Speed



World's first USB 3.0 logo certified solution from NEC

GIGABYTE P55A motherboards feature the next-generation SuperSpeed USB 3.0 interface from NEC that provides a 10x data transfer speed boost over USB 2.0. Data transfer between the PC and USB 3.0 devices is enhanced through dual-simplex transfer for simultaneous bi-directional data flow.



### USB 3x Power Boost



Utmost compatibility with 3x USB power boost

GIGABYTE P55A motherboards introduce a unique new USB power design that effectively triples the power output from all USB ports. The result is unequalled USB device stability due to sufficient power delivery from a single USB port. This also frees-up USB ports for additional USB devices.



### SATA 3.0 – 4x Speed via RAID 0



World's First SATA Revision 3.0 solution provider from Marvell

The very latest advancement in storage technology is SATA Revision 3.0 that effectively doubles the data transfer speed compared to SATA 2.0. GIGABYTE is working closely with Marvell to introduce SATA 3.0 on the full range of P55A motherboards. When using RAID 0 (Striping) mode, SATA Revision 3.0 can enable a data transfer boost of up to 4x over SATA Revision 2.0.



### Ultra Durable™ 3



Featuring 2 ounces of copper GIGABYTE Ultra Durable™ 3 motherboards.

GIGABYTE Ultra Durable™ 3 series motherboards are known for their top quality and innovative design. In particular they boast the industry's first consumer desktop motherboard design to use 2 ounce copper for both the Power and Ground layers of the PCB, Japanese Solid Capacitors good for 50,000 hours of operation, Ferrite core chokes with higher energy efficiency and Lower RDs(on) MOSFETs with lower resistance.

### Smart 6™ - A Smarter Way for PC System Management



GIGABYTE Smart 6™ is designed with user-friendliness in mind, offering a combination of 6 innovative software utilities that provide an easier and smarter way for PC system management. Smart 6™ manages system performance, boot-up time, security and easy system recovery with a simple click of a mouse button.

### GIGABYTE P55 Series Motherboards



GA-X58A-UD7



GA-P55A-UD3R

\*Available features vary by model. Please visit the GIGABYTE website to see a complete listing of motherboard model features.

For additional information about the GIGABYTE P55A series motherboards, please visit the GIGABYTE website at: <http://www.gigabyte.com.tw/Products/Motherboard/Default.aspx>

**GIGABYTE™**

you can hide the excess wires, such as the rear of the 5.25in drive bays.

You'll then need to repeat this process with the front panel cables for the power and reset switches and activity lights, which will hook up to a series of pins on the motherboard. Check the motherboard manual to see where you need to hook up the cables for the power and reset switches – there's a diagram in the first few pages that shows you which pins are for which connectors.

Remember that the coloured cables are always positive and the black or white cables negative. Once the front panel wires are in place, tie them together with a cable tie and push the excess cable towards the 5.25in drive bays and out of the way. Meanwhile, the cables for the front-mounted USB ports have a guide-pin so you know which way round to plug them into the motherboard. The USB headers are at the bottom of the motherboard and are labelled on the PCB.

## The Drive home

Next up is the hard disk and optical drive. Remove one of the 5.25in blanking panels from the front of the case by popping it out from the inside, and then insert the optical drive through the opening. Both cases we've used feature the same tool-less installation system for the drives, and it works well. The thumb-screw on each plastic bracket rotates 90 degrees left or right to lock it in place. Line up the screw holes on the drives with the holes in the bays, insert the brackets through the holes and rotate the thumbscrews to secure everything in place. Once that's out of the way, you can then install the PSU following the appropriate instructions on the right.

On the other side of the chassis, you'll now need to use cable tie plates to pin down any unused connectors, such as the Molex connectors. The idea is to keep all the cables as flat as possible so that the right side panel

## Gaming Rig

The SilverStone PS02 doesn't have cut-outs for cable routing, but it does have a deep cavity behind the motherboard tray where you can stash excess cables. Bundle all the cables, excluding the 4-pin ATX12V and the 24-pin ATX power connector, and route them towards the 5.25in bays.

You can then route the cables you don't need straight around the back of the case, using cable tie bases to attach them to the motherboard tray. Meanwhile, other cables that you do need, such as a Molex cable for the optical drive, can be routed from behind the 5.25in bay, keeping them out of sight and out of the way of airflow. You'll also need to use the Molex to 6-pin PCI-E connector that's bundled with the PSU in order to convert two Molex connectors into a power connector for your graphics card. Once everything is connected up, you can finish up on the other side of the chassis.

can still be fitted later. The best way to do this is to lay the case on its side so that you're not fighting with gravity in the process. Bear in mind that even a cable tying master can still end up with a slight curve in the side panel after doing this, but this will be unnoticeable once the top and bottom of the side panel have been slid back into place and you've screwed in the panel at the back.

Now all you need to do is to connect the SATA cables to the hard drive and motherboard and you're good to go.

## Installing windows

Before you can install Windows 7, you need to set your optical drive as the primary boot device. Head into the BIOS by pressing Del



Set your optical drive (CDROM) to be the first boot device so that your computer can boot straight from the Windows 7 disc. Not every BIOS has the same wording, but it will be similar.

## Media Editing Rig

Just because we don't have a modular PSU doesn't mean that we have to leave cables snaking around the interior like a scene from Raiders of the Lost Ark. Many cases have a small cut-out just behind the PSU shelf that's ideal for hiding unwanted cables and the Cooler Master RC-330 is one of them. Rest the PSU on your desk beside the case and thread all the cables through the cut-out, excluding the 24-pin ATX cable and the cable attached to the 8-pin EPS12V. You'll also need the SATA power cables for the drives, but you can easily thread these behind the case to their destination.

Once you've threaded the cables through the cut-out, you can lift the PSU into position on the shelf. Because the cables are running behind it, you'll need to apply some pressure to the PSU to make it line up with the four holes in the back. The easiest way to do this is to get a friend to hold the PSU in place while you screw it in from the back of the case. Once this is done, you can connect the remaining cables to the motherboard.

when your PC starts, and go to Boot Device Priority, which is under Advanced BIOS Options. Set the optical drive to the first device and the hard disk to the second, save the settings and restart the PC. You can then insert your Windows 7 DVD and press a key to boot from it when prompted.

You'll then be taken through the installation process. Once you've chosen your country you'll be presented with the installation screen, where you'll need to select Advanced Options. Here you can create a new partition by clicking the New button, and entering your chosen capacity.

If you want only one partition, click on the Next button without changing the numbers. However, if you want two equally sized partitions – perhaps one for the OS and apps, and one for data – then divide the number by two and click on Next. You can now assign the remaining space to a secondary partition, then select the partition to use as a system disk and select Start.

Once Windows is installed, download the latest drivers from the manufacturers' websites. For the Sapphire graphics card, head over to <http://game.amd.com>, or visit [www.nvidia.com](http://www.nvidia.com) for the Gainward card. You'll also need the drivers for the motherboard chipset and on-board components, such as the audio codec and network port. The Gigabyte drivers can be downloaded from [www.giga-byte.com](http://www.giga-byte.com), and the MSI drivers from [www.msicomputer.com](http://www.msicomputer.com).

Install the chipset driver first, then the graphics and audio drivers and then the rest. Make sure you restart the PC after each driver installation.

# Section 3: Performance & Overclocking

When it comes to overclocking, you'll find all the BIOS options that need tweaking on just two screens. Below, you'll see shots of those screens detailing the exact settings we used to create rock solid overclocks on both of our rigs. If the hardware gods are smiling on you, then you should be able to tweak your BIOS settings so that they look the same as these screens and get a killer overclocked PC.

However, bear in mind that mileage varies in the world of overclocking. While we executed relatively light overclocks, these settings may not be stable on your particular system. It may be that your CPU isn't as resilient as ours, or that your motherboard's

supply of millivolts is drooping slightly below what the CPU needs for stability.

If this is the case, then some adjustments may be required. What's more, with the Internet awash with rumours, hearsay and the occasional true story about components exploding while overclocking, inexperienced overclockers might not be comfortable fiddling with the voltages options on their shiny new motherboards either. If this is true for you, the easiest way to get your overclock stable is to keep all the other settings the same but to lower the frequency a little.

Whether you're lowering the HTT speed for the gaming rig or the Base Clock speed for the media creation rig, lower the frequency by about 2MHz at a time and restart stress testing

(see opposite). You'll lose a few megahertz from your overclock, but stability is paramount if you don't want your PC crashing when you're just about to successfully diffuse the bomb in Counter-Strike or about to finish an eight-hour video encode.

It's also worth bearing in mind that the MSI 770-C45 in the gaming rig has the option to save your BIOS settings in a profile. To access this option, press Escape to go back to the main page of the BIOS and then enter the User Settings menu. After that, select a profile and hit Save. If for any reason your overclocking settings are lost later on, you can return to this menu and hit Load to reset them instantly, saving you a lot of time.

## Overclocking the Gaming Rig



First, adjust the CPU FSB to 250MHz, and then use the arrow keys to navigate down to the option titled FSB/DRAM Ratio and set it to 1:3.33. This will overclock the memory slightly, making it run at 1.666GHz instead of 1.6GHz.



Next up, copy the voltages in this screenshot, which we used to get our overclocked system running solidly at 3.5GHz, and disable Spread Spectrum at the bottom of this section.

## Overclocking the Media Rig



Before adjusting the clock speed, hit the Enter key on the Advanced CPU Core Features option. Here you'll be able to disable the Intel Turbo Boost Tech option, which you'll need to do if you want to overclock the CPU properly by hand. Next, enable the Base Clock (BCLK) Control and set the BCLK Frequency (MHz) to 190. Finally, set the System Memory Multiplier to 8.0.



Here's the list of the voltages we used to stabilise the 3.8GHz overclock for the media editing rig. It didn't take much for the Lynnfield chip to reach this overclock, with only the VTT/QPI option going into the pink warning zone.

## Stress testing

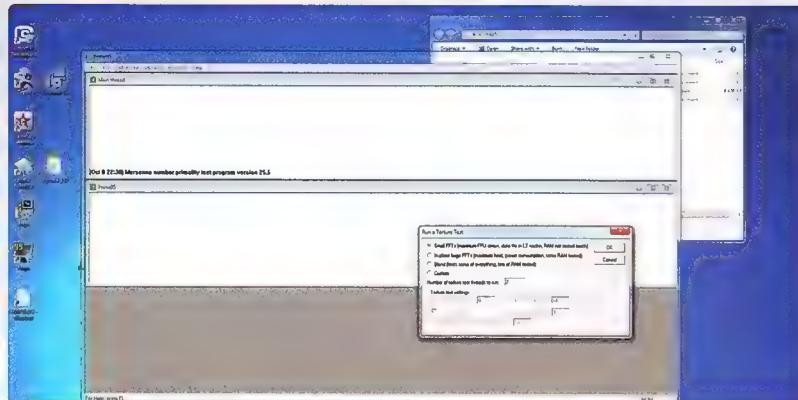
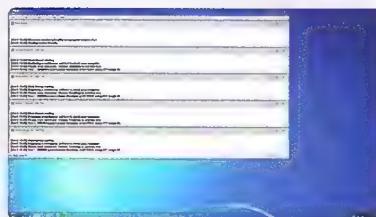
Once you've entered the overclocking settings into the BIOS, press the F10 key to save them and exit. When the system boots back into Windows, it's time for stress testing. First download and install Core Temp from [www.alcpu.com/CoreTemp](http://www.alcpu.com/CoreTemp) and load it to monitor the temperature of your CPU. Next, head over to [www.mersenne.org/freesoft](http://www.mersenne.org/freesoft) and download the latest version of Prime95. Install the app then select the smallfft test, click on OK and let it run for 24 hours.

Prime95 puts all the CPU cores under full load and then reports the results of the tests. You want to see the word 'passed' every 12 lines or so in the application window. The BIOS profiles we've put together shouldn't cause you any problems, but overclocking is not an exact science. If the overclock throws up any errors, then make slight adjustments to the voltages, upping them one notch at a time until you get nothing but passes for 24 hours. If you're uncomfortable with the amount of voltage or the temperature of the CPU, you can always reduce the speed in the BIOS.

On the gaming rig, if the CPU

temperature in Core Temp exceeds 50°C when running Prime95, then something isn't quite right. For the media editing rig, the CPU temperature should not breach 70°C. Make sure that the CPU cooler is fitted correctly, sitting flat on top of the CPU, and that the fan is plugged into the motherboard, and spinning.

Even if you get an error or a blue screen of death in Prime95, the system may still seem fine in general use. However, this will translate into blue screens and system crashes when the CPU is running at full load. Take care to monitor CPU temperature – under load, the HSF needs to be able to keep it steady and stop the CPU overheating. The Tjunction temperature displayed in Core Temp is the temperature at which this happens.



Once you've started Prime95, set it to run the smallfft test for 24 hours. The test will put all your cores under full load and periodically report the results. You want to see the word 'passed' every 12 lines or so.

## Tweak Crysis

Very few PCs can play Crysis with all the sauce turned on, and our wallet-rescuing gaming rig is no different. To get the best gaming experience, you need to adjust some settings in Crysis' Advanced Options menu.

We play Crysis at 2,560 x 1,600 with High detail in our benchmarks. However, these settings were too much for the overclocked gaming rig, which chugged along at a minimum of 20fps and an average of 30fps. Setting the Objects Quality and Shadow Quality settings to Medium increased the minimum to 25fps and the average to 35fps, which is what we consider playable. However, if the maximum resolution of your display is 1,280 x 1,024, then

you can crank up the AA to 4x to rid the screen of any jagged edges. We set everything to High and the minimum frame rate still didn't drop below 25fps.

As a decent 24in display costs as much as this PC, we doubt that many people with such a display will be considering such a cheap system.

If you have a large monitor, you'll need to make some hefty drops in the Advanced Options if you want to use the native 1,920 x 1,200 resolution of your display. We recommend 1,680 x 1,050 instead.

## Performance

### Gaming Rig

It's been two years since Crysis was first unleashed on the public, but it remains the ultimate in gaming benchmarks, and is still crippling computers that cost over a grand. Even so, the stock performance of our gaming rig was very respectable. At 1,680 x 1,050 with 2x AA, the rig managed to push out a minimum frame rate of 19fps and an average of 25fps. Applying our overclock only pushed up the minimum by 1fps, but the average saw a small increase of 5fps.

All is not lost though, because a few minor tweaks can provide you with a smooth frame rate without sacrificing too much in the way of eye candy.

The gaming rig doesn't tear through the Media Benchmarks in quite the same enthusiastic manner as the media editing rig, but the scores are respectable nonetheless. Our overclocking efforts saw a 20 per cent improvement on the overall score, which jumped from 844 points to 1,072 points; not a bad result for just a few minutes' work in the BIOS.

### Media Editing Rig

Intel's Lynnfield CPUs are over-priced for their performance out of the box, but they can overclock like the clappers with the help of a decent motherboard. We've overclocked a Core i5-750 to well beyond 4GHz before, but with this PC you'll want to go for a more accessible overclock with a healthy measure of longevity. The Gigabyte board did us proud in our tests, and was happy to run our CPU at 3.8GHz without even a whimper of complaint.

Even at the CPU's stock speed, Turbo Boost (rev 2) ensured that our media editing rig racked up an overall score of 1,492 in our Media Benchmarks – 61 points ahead of an Intel Core i7-920 at stock speeds. However, our overclock pushed the scores through the roof, with the media rig clocking up an epic score of 2,647 in the multi-threaded video encoding test, which contributed to an overall score of 1,899. This score is about 100 points behind those of Intel's considerably more expensive Bloomfield chips when they're overclocked, proving that this is a ludicrously powerful workhorse PC for the money. 



Set the Objects Quality and Shadows Quality to Medium, and everything else to High, and you can run Crysis at 1,680 x 1,050 with 2x AA



**XFX**

play hard.



EPS 12V MODULAR POWER SUPPLY

**BLACK EDITION**



Manufacturer

XFX Inc.

Phone: (852)2773 9911

Fax: (852)2334 0775

Web: [www.xfxforce.com](http://www.xfxforce.com)



Authorized Distributor  
Altech Computers Australia  
Phone: 1300 131 600  
Email: [xfx@altech.com.au](mailto:xfx@altech.com.au)  
Web: [www.altech.com.au](http://www.altech.com.au)



## POWER HUNGRY?

Satisfy your need for power with the XFX 850W Black Edition PSU. Specifically designed to support multiple high-end graphics cards, the XFX 850W BE maximizes your gaming experience with unparalleled features and exceptional performance:

- Crossbreed engineering featuring fixed and modular cables that deliver serious performance and superior flexibility.
- Silver-certified, this high-efficiency, eco-friendly PSU runs cool and quiet.
- Low ripple, high stability output ensures that your rig won't freeze mid-frag.
- Single, high-power +12V rail eliminates problems associated with multiple +12V power distribution

Power has never looked this good. Hungry for more?

[www.XFXforce.com](http://www.XFXforce.com)

# HARDWARE

NEWS, REVIEWS AND ROUNDUPS ON THE LATEST HARDWARE

War is upon us once again this month, as ASUS and GIGABYTE duke it out with their premium X58 motherboard offerings. They've pulled out fisticuffs for a duel to the death, in our custom-built (green) boxing ring, and the results are definitely worth watching. We've also pitted two of NVIDIA's minute baby graphics cards against the biggest and best

from ATI, thrown a nice P55 board into the mix and stamped all over it with IKONIK's sexiest case ever. It's pants-changingly exciting, so make sure you ogle our glossy pictures with jealous envy. Finally, we've taken more power supplies than we knew what to do with, did things to them that probably shouldn't have, and then wrote about it. Go check it out!



48

Powered by

**msi**™

## HARDCORE CONTENTS

### MOTHERBOARDS

ASUS P6X58D Premium	36
GIGABYTE X58A-UD7	37
EVGA P55 SLI	38

### VIDEO CARDS

XFX 5850	39
Leadtek GT240	40
Galaxy GT240	41
Manli 5870	42

### MEMORY

A-Data X-series PC3-16000 CL9	43
Patriot Viper2 'Sector 5'	45
PC4-16000 CL8	

### POWER SUPPLIES

HuntKey X7 900W	43
-----------------	----

### PERIPHERALS

Razer Orochi Mobile Gaming Mouse	44
----------------------------------	----

### MONITORS

Viewsonic VG2427WM	45
--------------------	----

### SYSTEM:

NRG Typhoon	46
-------------	----

### PC CASES

SilverStone Fortress FT02	47
IKONIK Ra X10	48

### HEAD2HEAD:

Power Supplies	50
----------------	----

### KITLOG

	64
--	----



45

# HOW WE TEST

We do a lot of testing in our labs, and we look long and hard at every piece of hardware to determine whether or not it passes muster. From taking a new card out of its packaging, to bundled extras, to performance, every facet of a given piece of kit's 'user experience' is under scrutiny.

In some instances, we have tough benchmarks to help us rate gear. For a CPU or a graphics card, raw performance is of course the most vital stat as whether it stinks or smells like roses, as well as the ability to overclock well. But there are other things we pay attention to in the review process.

Value for money is an important consideration, especially during the current financial climate. High end gear is expensive enough as it is, so we also look for good bundles. For instance, a graphics card that comes with a game or two, all the cabling you'll need, and little surprises like tools and other bumpf will score higher than a card that costs similar, but doesn't give you any presents.

Build quality is another thing we rate. From a PC case to a motherboard, we like our hardware well-made and capable of taking a bit of punishment. We also like any included manuals to be clear and concise.

A lot of what we look for can be hard to put into numbers, we admit, but we try to think about what any enthusiast would think about their new gear after laying down money for it, installing it, and then using it.

And our benchmarks help, too. We've picked a suite of games and applications that anyone can get access too, so that you – the reader – can easily compare your own gear with the kit we have in each issue. In fact, we'd recommend to all our readers that they run all of these tests on their systems and save the results, so you can always have a familiar benchmark of your own to compare to the latest gear in *Atomic* each issue.



## HOT AWARD WINNERS!

ISSUE 109

Just some – well, the only one, in fact – of this month's HOT AWARDS...

### IKONIK Ra X10 LIQUID

"While there are a few small niggles concerning the rest of the case's build strength, so long as you don't LAN too much with it this is hands-down the most innovative case the industry has seen for years – and the best value case money can buy."

90/100

Our test LAN: NRG systems with Phenom 9850 CPU, 4GB of DDR2 RAM and a 4870X2 graphics card. The mainstay of our games testing.

# CPU Benchmarks:

## Hexus PiFast

<http://pifast.hexus.net/pifast.php>

PiFast is a program that essentially calculates pi to a set amount of decimal places. It is a single-threaded application (one core/thread) and we run it at ten million places (10, 000, 000) using the Chudnovsky method, in the standard mode with no compression, and a FFT length of 1024kb. The program is free, so feel free to run it on your CPU and compare. Memory bandwidth plays a significant role in the final performance of this program, so be sure you bump up the frequency as well as the CPU clock!

## wPrime

<http://www.wprime.net/>

"wPrime uses a recursive call of Newton's method for estimating functions", says the website as it attempts to explain in plain English what it does. What it does is, essentially, complex square rooting and other number functions, which are able to be split up evenly between multiple cores, or simply run on a single core. We use wPrime 32M in both single and multi-threaded. The results of the single run are divided by the results of the multi run, and this gives us the efficiency of the CPU being tested – very useful knowledge to have when comparing chips and evaluating the benefits of overclocking.

## Cinebench R10 x64

[http://www.maxon.net/pages/download/cinebench\\_e.html](http://www.maxon.net/pages/download/cinebench_e.html)

Cinebench is a stalwart benchmark, and is one of the more entertaining ones to watch. It focuses on rendering an image at 800 x 600 resolution, complete with ray-traced light effects and much more. This is able to be run in either singlethreaded or multithreaded mode, and efficiency is calculated exactly the same way as for wPrime. Simply download the .zip file, extract, and run! The program also supports up to 16 threads in total, and even eight threads with Nehalem is an impressive sight to see. The difference in performance between 32- and 64-bit is minimal – just keep that in mind if your results for the same setup are slightly different.

## Everest Ultimate Edition

<http://www.lavalys.com/>

Everest is a system information tool that monitors voltage, temperature, as well as reporting on a massive list of other areas of your system. Hardware and software are noted here, but perhaps the most useful part of this program is the memory benchmarks. Ready for the fastest of dual/tri-channel memory, this tests the read and write bandwidth as well as latency. The program is a small download, but keep in mind that you only get a thirty day trial until you purchase the full version – something recommended if you're into getting the most info about what your tech is up to.

# GPU Benchmarks:

## Crysis

<http://www.ea.com/crysis/>

Crysis is one of those games that can scale from Average Joe's rig all the way to the beastly Dream PC in Kitlog; but due to recent graphics card releases we needed to bump it up a notch. Our testing now uses a standardised timedemo run, with all settings on high at a resolution of 2560 x 1600. While we can't run any antialiasing at this res and still get playable framerates on most cards, it's still more than enough to really give cards the workout they truly deserve.

## Race Driver: GRID

<http://www.racedrivergrid.com/>

GRID, as some racing aficionados will know, is one of the most fun games of its genre to come about for quite some time, giving an accurate damage model along with realistic handling and a great visual style. Not only that but it is also very scalable over multiple GPUs, and is also capable of running on lower-end gear. We chuck all the settings to High, with 8 x MSAA at 2560 x 1600 for this test, using FRAPS to monitor the frames per second as we tear around the track for a single lap in our car of choice – the Nissan 350Z.

## 3DMark 2006

<http://www.futuremark.com/benchmarks/3dmak06/introduction>

Designed as a benchmark for DirectX9 based systems, 3DMark 2006 (or 3DMark06) has been a staple of the enthusiast diet for many years. With four graphical tests, and two CPU tests, these combine to give a final overall score that allows direct numerical comparison to any other system in the world and, best of all, it's completely free. Just head to the URL above, and download your copy to compare to any of the reviews in the mag. All of the tests are run at stock settings, so just install, run, and compare – it couldn't be easier!

## 3DMark Vantage (2008)

<http://www.futuremark.com/3dmakvantage/>

As the first extremely convenient benchmark program around for DirectX 10, 3DMark Vantage is a new contender in the benching scene – and is proving very popular. While you can download and run it for free, this is only once, requiring a small fee to register your copy (though the bragging rights for showing off your rig may be worth it). Some graphics cards will even give you a copy! We run this at stock settings, which is the most appropriate for comparison between our results and yours. This is also significantly better at multi-gpu performance scaling efficiency.

# ASUS P6X58D Premium

One seriously packed motherboard.

**Street Price** RRP \$449 **Supplier** ASUS

**Website** [www.asus.com.au](http://www.asus.com.au)

**Specifications** Socket LGA1366; Intel X58 chipset; ATX form factor; 3x PCIe x16; 1x PCIe x1; 2x PCI; 4x SATA2, 2x SATA3; DDR3-1800

I've missed the X58 chipset. Sure, it's a little toasty when running, and has to be paired with a southbridge to manage to do the most basic of storage tasks, but it comes with a feeling of seriously elite tech that the P55 chipset never seems able to convey. It comes with a feeling of power, of sheer unadulterated geekdom. And that is why I love this board.

Expertly cooled with a minimalistic heatsink that covers the X58 chip in the middle of the mobo, all the power phases for the LGA1136 socket and the ICH10 Southbridge, it managed to remain surprisingly cool even when under load. Its coolness didn't stop there, and the PCB colour helps it to look like one serious piece of tech. While the heatsinks do spin around three sides of the CPU socket, they're quite flat and there's plenty of space to install even the largest of cooling gear. There's a decently vast expanse between the socket and the six DDR3 slots, allowing installation of up to six sticks in three channels of memory bandwidth, tunnelling directly into the CPU for maximum speed.

Power needs are supplied by the typical

## SATA 3.0 performance

Comparing the same Seagate Barracuda XT 2TB via SATA 2 & 3 on the same board yielded a noticeable, but not breathtaking, performance increase:

Seagate Barracuda XT 2TB	SATA 2.0	SATA 3.0
Average Read (MB/s)	107.4	116.9
Random Access (ms)	16.8	16.5
Burst Speed (MB/s)	220.4	272.6



8- and 24-pin power connectors that lie in their usual places, though the 8-pin connector might prove a bit of a squeeze when installing within the confines of a case. Storage options cover six SATA 2.0 ports from the ICH10 chipset, a strangely cut-down amount whose extra bandwidth has been diverted not to the full complement of ports; but rather towards an onboard Marvell chip. This chip provides two SATA 3.0 ports, tunnelling into the Southbridge to provide an interesting boost in speed (see boxout), though the lack of an IDE port on the board does limit the storage options somewhat.

Along the bottom of the mobo lie the usual headers you'd expect, as well as hard power and reset buttons that can help with overclocking. Annoyingly there is no Clear CMOS, though the auto-recovery of the BIOS is decent enough to get you out of most overzealous settings. There is another button on the board right next to the DRAM slots, but this is the MemOK! button that insofar as can be determined is about as useful as a leather finish on your car's tyres. Onboard

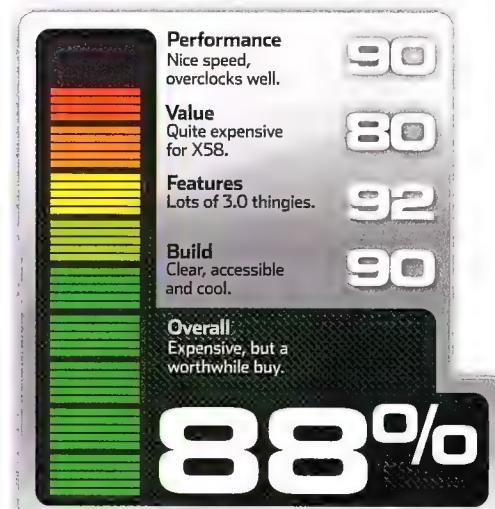
audio is the usual top-end Via chip, the VT2020.

Expansion slots are well crafted and provide capacity for triple, dual or single graphics cards without too much slowdown; plenty of PCIe 2.0 lanes are still available, a limitation that the P55 platform suffers from. Rear I/O options are decent too, with two PS/2, Clear CMOS, two USB 3.0 ports (from an onboard controller chip), Optical/Coaxial, four USB, two Ethernet, 6-pin Firewire and 7.1 channel audio. Why there was a Firewire port thrown into the mix rather than more USB ports is confusing, but at least USB 3.0 is backwards compatible.

Performance of the board at stock settings was admirable, proving that ASUS has achieved some serious tweakage across both Intel platforms. While the overclock on the Core i7 975 reached 4238MHz (163 x 26, 1.475V), the chip felt like it wanted to go further but no extra speed could be squeezed out. For an RRP of \$449, which will be lower in stores, this is a decent board that offers solid support for future technologies, and has nice performance to boot. 

## ASUS P6X58D Premium

	1975	133x25; DDR3-1600 8-8-8-24; 3.2GHz	150x25; DDR31500 8-8-8-24; 3.6GHz	160x25; DDR3-1604 8-8-8-24; 3.84GHz
PiFast	24.37s	21.86s	20.39s	
wPrime 32M – single thread	36.975s	32.991s	30.965s	
wPrime 32M – multi-thread	7.024s (5.26x efficiency)	6.238s (5.29x)	5.867s (5.28x)	
CineBench R10 64-bit – single thread	5092	5596	6026	
CineBench R10 64-bit – multi-thread	20089 (3.95x efficiency)	22621 (4.04x)	23689 (3.93x)	
Everest Read	16612MB/s	15915MB/s	16897MB/s	
Everest Write	14124MB/s	13567MB/s	14466MB/s	
Everest Latency	48.7ns	50.5ns	47.8ns	



# GIGABYTE X58A-UD7

A leap too far?

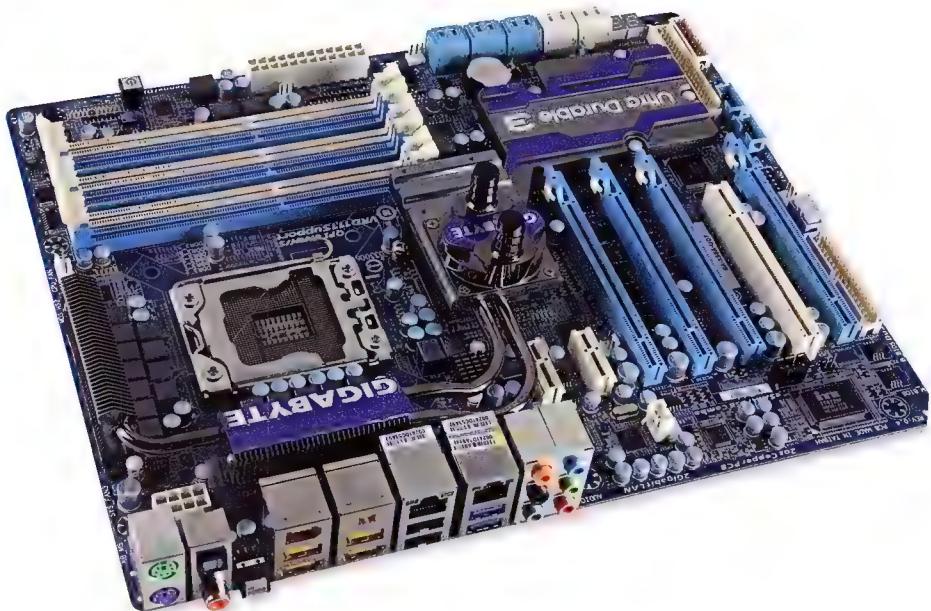
Street Price \$493 Supplier GIGABYTE  
Website [www.gigabyte.com.au](http://www.gigabyte.com.au)

**Specifications** Socket LGA1366; Intel X58 chipset; ATX form factor; 4x PCIe x16; 2x PCIe x1; 1x PCI; 8x SATA2, 2x SATA3; DDR3-1800

**G**IGABYTE has stuck to one naming scheme for the past little while; with the chipset first, a hyphen in the middle, then the market it's aimed at in the form of a code, numbered highest to lowest. It starts at UD2 (for some reason), and the highest-end X58 board used to be the EXTREME (not the UD6, which again the reasoning behind was... obfuscated). Now Gigabyte's brought out a board that goes one *higher* than its previous highest, the UD7. Likely thinking along the lines that "OMG, more equals better", this is a board that'll run you almost \$500 – but do you get enough back for all that cash?

Based around the X58 chipset that we know and love, paired with the ICH10 Southbridge, this mobo has a completely excessive cooling system that connects all major components with nickel-plated heatpipes, meeting above the chipset in an optional waterblock mount. Not only can you watercool it, but there's a huge chunky heatsink included in the box that slots into the twin grooves on the heatsink, devouring two expansion slots with two more heatpipes and plenty of aluminium. For all this excess you'd almost expect an NF200, but there is none included.

Even though the heatsinks around the LGA1136 socket are big, there's just enough room for most large after-market heatsinks, though fiddly waterblocks will prove tricky to install with the huge amount of components around the socket itself. Six DDR3 slots are in the usual placement, as well as a Clear CMOS and power button. A 24- and 8-pin power connector have each been squeezed onto the edges of the board, and there are six fan headers. An LED POST screen makes an appearance in the lower right



corner, as well as a Floppy, IDE, front panel, two USB 2.0 headers and a Firewire header.

Smooshed into all this cramped space are six right-angled SATA 2.0 ports, joined by four white SATA ports; deceptively split so that two are SATA 3.0, and two are standard 2.0 ports. The former are powered off the same Marvell 9128 chip that other offerings are using, but we found in testing that there were issues with the firmware, which we couldn't resolve by deadline. However the hardware is solid, so once software is fixed this should be groovy.

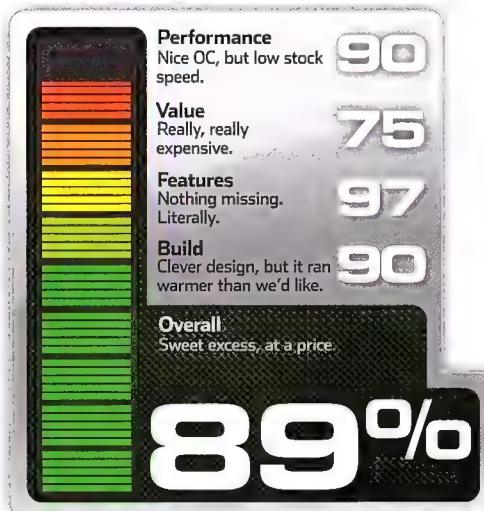
Continuing the "throw everything in, as well as the kitchen sink" theme, there are four physical PCIe x16 slots, though two of them are only x8 electrically thanks to the onboard SATA/USB 3.0 chips. There's only one PCI slot, but this is pretty redundant for all but a few expansion cards. The IO panel heats things up again, offering two PS/2, Optical/Coaxial, Clear CMOS, 6-pin Firewire, 4-pin Firewire, two hybrid USB/eSATA ports, four

USB2.0 ports, two USB 3.0 ports (powered by a NEC chip), two Ethernet ports and 7.1 channel audio run off a Realtek ALC889 chip.

Whatever space was left on the board after this giant amount of features were crammed in has been taken up by LEDs, resistors and capacitors – there is quite literally not a single square centimetre that isn't filled with at least five different devices. All this complexity makes it a marvel that the board works at all, but as the stock performance shows it is a little noisy, performing worse than the ASUS offering. When overclocking we managed to get it to a rather high 4300MHz (172 x 25, 1.4825V), but performance was still a little behind the curve. For those ultra-crazy upgraders there is no other board that offers as much; for everyone else, there are much cheaper choices out there.  JR

## GIGABYTE X58A-UD7

	1975	133x25; DDR3-1600 8-8-8-24; 3.33GHz	150x25; DDR3 1500 8-8-8-24; 3.75GHz	160x25; DDR3-1604 8-8-8-24; 4.00GHz
PiFast	25.29s	22.59s	21.12s	
wPrime 32M – single thread	38.596s	34.273s	32.712s	
wPrime 32M – multi-thread	7.317s (5.28x efficiency)	6.538s (5.24x)	6.068s (5.39x)	
CineBench R10 64-bit – single thread	4849	5383	5776	
CineBench R10 64-bit – multi-thread	19449 (4.01x efficiency)	21684 (4.03x)	22818 (3.95x)	
Everest Read	16613MB/s	16520MB/s	16871MB/s	
Everest Write	13919MB/s	13524MB/s	14435MB/s	
Everest Latency	48.9ns	50.8ns	47.8ns	



# EVGA P55 SLI

Nothing says cool like a black PCB.

Street Price \$300 Supplier EVGA

Website [www.evga.com](http://www.evga.com)

Specifications Socket LGA1156; Intel P55 chipset; ATX form factor; 3x PCIe x16; 2x PCI; 1x PCIe x1; 6x SATA; DDR3-1600

We checked out EVGA's premium P55 mobo last issue, and though it was expensive the performance of the motherboard justified (in part) the cost. EVAG shot through its midrange board for us to have a look at, and while it doesn't have all the additional features it does seem like a more appropriate board for most Atomicans, so we've thrown our testbed gear into it for some loving.

First off, the colour of the board; with a black and grey thing going on, it's a seriously sexy piece of tech. Even cooler is the small plastic lump in the middle of the board that glows red with the EVGA logo when turned on, giving the mobo a sense of power and speed. Thanks to the P55 Express chipset used, there is no Northbridge chip used on the board, freeing up some room around the LGA1156 socket. Handily, there are mounting points for both LGA1156 and LGA775, great for those with heatsinks and waterblocks that use the older mount. The memory slots are placed just far enough away from the socket to be usable, but some taller sticks of DDR3 might interfere with the heatsink when placed into the closest (black) slot.

This board has a single 8-pin power connector in the usual place (which is more than enough for this platform) as well as a 24-pin ATX power connector along the right hand side of the board. There's a pinout available for an IDE connector, though none is included on the board. It won't be missed however, since there are six right-angled SATA connectors available for storage duties. Also missing is the Floppy connector, but if you're so dedicated to the now-ancient tech there are USB Floppy drives out there for just that purpose.

A LED POST screen sits in the bottom right



corner, reading out error messages when POST fails as well as displaying the CPU temperature while booted. Surrounding the screen are all the standard headers you would expect to find on a mobo, offering more USB ports as well as audio and front panel connectivity. Thoughtfully included along the bottom edge of the board are hardwired power and reset buttons, joined by a Clear CMOS button. Also hardwired onto the board is a speaker, great for those forgetful builders who forgot to connect it.

The expansion slots are pretty good for a P55 board, though thanks to the limited amount of PCIe lanes coming from the CPU there is only capacity for a single graphics card at the full 16x speed; if two are used, this drops to dual 8x. Definitely not the platform for multi-card setups, but that's why X58 boards are still around.

Rear I/O options are well thought out with one PS/2, six USB, Clear CMOS, Optical/Coaxial, two eSATA, 6-pin Firewire, two Ethernet and

7.1 channel audio. In other words, pretty much everything you'd need.

The P55 chipset remained cool when using the board, covered and cooled by the small black heatsink in the lower right corner of the mobo. Even when overclocked the temperature remained pretty stable, and thanks to the clear BIOS screen it was easy to tweak the different settings to reach the maximum clockspeed of 4202MHz (191 x 22, 1.4925V BIOS). Easy, that is, when we compensated for the vDroop of up to 0.6V, just enough to cause instabilities when overclocking. This isn't the best overclock we've gotten, but it's made worse by stock performance up to four seconds slower than the EVGA P55 FTW 200. A good choice if you love the colour, but there are better options out there. 

## EVGA P55 SLI

	7870 133x22; DDR3-1600 8-8-8-24	150x22; DDR3-1500 8-8-8-24	175x22; DDR3-1400 8-8-8-24
<b>PiFast</b>	29.73s	26.41s	22.83s
<b>wPrime 32M – single thread</b>	44.297s	39.278s	33.656s
<b>wPrime 32M – multi-thread</b>	8.439s (5.25x efficiency)	7.481s (5.25x)	6.405s (5.21x)
<b>CineBench R10 64-bit – single thread</b>	4132	4652	5434
<b>CineBench R10 64-bit – multi-thread</b>	16600 (4.02x efficiency)	19001 (4.08x)	21162 (3.89x)
<b>Everest Read</b>	14156MB/s	15314MB/s	15928MB/s
<b>Everest Write</b>	10734MB/s	12088MB/s	14108MB/s
<b>Everest Latency</b>	47.7ns	46.1ns	44.4ns



# XFX 5850

Not a bad chunk of card.

Street Price \$400 Supplier XFX  
Website [www.xfxforce.com](http://www.xfxforce.com)

Specifications 725MHz core; 1000MHz memory (4000 effective); RV870 'Cypress PRO' core; 1440 shader units; 1024MB GDDR5; 256-bit memory interface; dual slot PCB with active cooling; dual 6-pin PCIe power connector

Card info [www.techpowerup.com/gpuz/edq29](http://www.techpowerup.com/gpuz/edq29)

**G**raphics cards don't really change too much; you've either got an ultra-high-end-beast that looks never to be beaten (give it a few months and think again), or you've got something a little bit more reasonable. The 5850 is almost in the latter, being affordable enough at \$400 without being overly expensive. It's a bridge that joins the two camps, an in-between solution that blurs the line between each side and gives some pretty tempting features too.

The most tempting, as with any card, is the graphics core. Itself a chip manufactured on a 40nm process (the smallest commercial high-volume size made today), it boasts over a billion transistors that make up a total of 1440 shader units. Each shader unit is a relatively simple processor that works almost like a worker bee in a hive, buzzing away as a collective entity to achieve a pretty huge result. It's running at stock clock speeds, with no factory overclock applied. There's also 1GB of GDDR5 memory onboard that is running through a 256-bit memory interface, but we've found that even that much bandwidth available can be enough to starve the shader units in some circumstances.

Physically the card is pretty darn showy, with a big sticker applied to the front face of the card that meshes decently with the black and red superautomotive styling. The



plastic shell is meant to channel airflow that is sucked in by the squirrel-cage fan at the end, mostly exhausting it outside the case (though some slips past the twin Crossfire nipples within the case). Display outputs boggle the mind with two DVI, one HDMI and one DisplayPort, and up to three of them can be used at any one time for a phenomenal amount of screen real estate. Not shown in the picture are the two 6-pin PCIe power connectors that reside in a small lip at the end of the card, providing all the delicious electricity that this card craves.

While this is just a reference heatsink, it's not a bad performer. Temperatures at idle sat at a cool 44 degrees, hitting a load of 66 degrees. The fan was quieter than a mouse in marshmallow slippers while idling at 51.8dBA, though at load this increased into a mouse-devouring feline yowl to generate 61.5dBA. More or less forgivable, but we'd still prefer a quieter design. All things considered this design is more than enough for some

overclocking, and we managed to bump up the core speed an extra 21 per cent to 880MHz, while the memory made an impressive 20 per cent increase to 1200MHz. Oddly it seemed to be relatively sturdy when pushed past this stable limit, however a persistent graphical error glitch appeared on the card if memory was clocked past 1200MHz – even if it was returned to the original clockspeed without a restart.

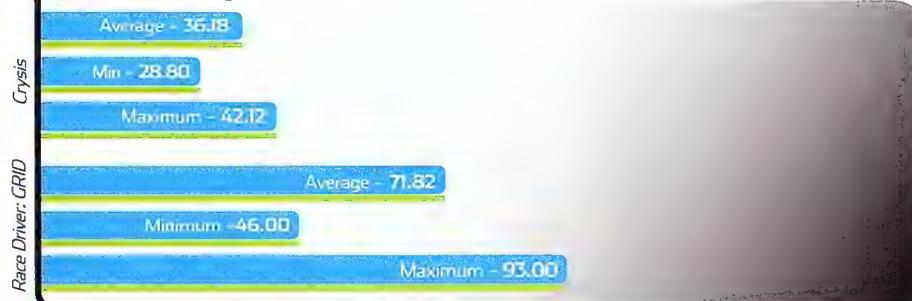
Performance under our new testing regime was very nice, with Crysis very playable at the huge resolution we test at, and GRID also providing plenty of performance. Both 3DMark06 and 3DMark Vantage show performance improvements over last month's 5850 offerings, a sign that ATI/AMD's driver team are making some serious progress. This card is more than enough for some high-res gaming, and to top it all off there's an included steam voucher for DiRT 2, the first DX11 game to be released on PC.

However, while the XFX card has a nice bundle and performance, it is ever so slightly more expensive than the competition that has included the same game. If you need a well-performing card for a decent price from a brand you trust, however, this is worth checking out. 

## XFX 5850 3d Mark scores



## XFX 5850 Gaming Benchmarks



# Leadtek GT240

Not the prettiest card ever, but decent

Street Price \$125 Supplier Leadtek  
Website [www.leadtek.com](http://www.leadtek.com)

Specifications 550MHz core; 900MHz memory (800MHz effective); 1340MHz shader clock; GT215 core; 96 stream processors; 512MB GDDR5; 128-bit memory interface; single slot PCB with active cooling

Card info [www.techpowerup.com/gpuz/eruh5](http://www.techpowerup.com/gpuz/eruh5)

**G**raphics cards can be a contentious topic within geeky circles; from comparing the length of their pixel-pushers to the specs of the tech inside them, they're always something of a bragging point. While the GT240 will never really be something you'll slap down on a table to the envy of all the geeks in the room, forcing them into a submissive rapture, you'll definitely be quite pleased with it in the long run.

Leadtek's version of the GT240 comes in with reference clocks applied, but carries a price that is roughly \$20 over the competing and more 'basic' cards in the market. What this extra money nets you isn't quite clear, as there isn't an included game or similar, and the end result is a card that performs similarly to a reference card but doesn't sweeten the deal. Still, it does come with a relatively fancy heatsink, though unfortunately this bumps the physical size of the card out sideways, which can interfere with other expansion cards in the system.

The reasoning behind such a wide heatsink isn't clear, as the GT215 core running on the card boasts a small power draw of 69W. It's got 96 stream processors that have been manufactured on a 40nm process, winning the card similar specifications to a 9600GT but bringing to the table a host of updated specs. DirectX support has been bumped up to 10.1, as well as an integrated audio unit that handles digital audio signals, while the PCIe power



connectors have been completely removed. It's nice to see a card that can be run completely off the PCIe slot, and it shouldn't need more than a basic power supply to run it.

Included with the core is 512MB of speedy GDDR5 memory on a 128-bit bus, a very nice amount of bandwidth is provided for this relatively slow card. Indeed this is one of the first showings of the zippy fifth-generation GDDR memory on a budget card, and prices seem to have finally fallen enough for it to be a viable design option. Though the card came clocked at reference speeds, we increased the core clock seventeen per cent to 642MHz as well as the memory up 22 per cent to 1099MHz. This is a great result for both these components, and the additional memory bandwidth definitely had a noticeable affect on performance.

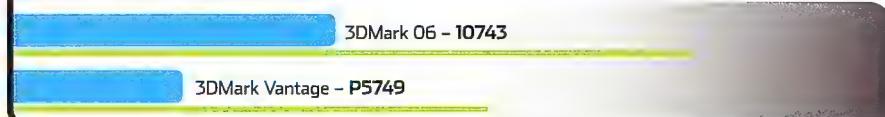
Performance at stock settings was everything we'd really expect from a budget card; not quite enough performance to power our GRID or Crysis tests to an adequate

level, but plenty of grunt to rip through both 3DMark benchmarks and gain admirable scores. For a cheap card, this is pretty nice. Definitely not worth upgrading to if you're running a 96/9800GT or higher, but anything lower than this would prove a worthwhile improvement.

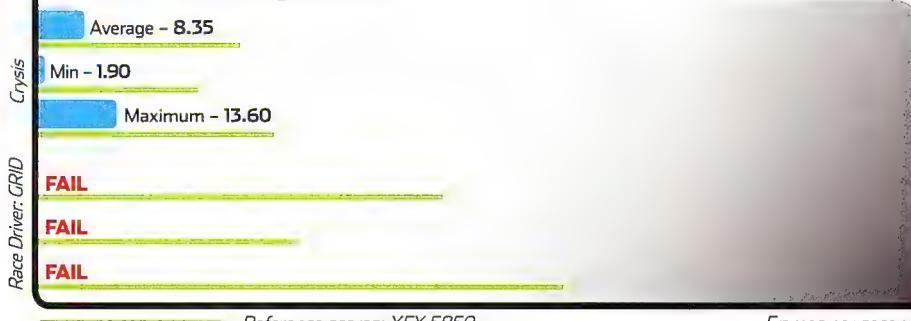
Physically the card remained quite cool at idle with 31 degrees and 50.2dBA generated, one of the quietest cards we've looked at. Load was only seventeen higher at 48 degrees, and did so with a very quiet 51.8dBA. It's so quiet that you could game with the sidepanel off and not really pick out the graphics card from the background noise of the system!

Leadtek doesn't pack in a game or anything extra with the GT240, which seems like a bit of a missed opportunity. While the performance is attractive for the price, it becomes less so when considering the other cheaper versions of the same card on the market; and no amount of silence can make up for performance per dollar.  JR

## Leadtek GT240 3d Mark scores



## Leadtek GT240 Gaming Benchmarks



Frames per second



# Galaxy GT240

Attention-grabbing, but for all the wrong reasons?

Street Price \$105 Supplier Galaxy  
Website [www.galaxytech.com](http://www.galaxytech.com)

Specifications 550MHz core; 900MHz memory (1800MHz effective); 1340MHz shader clock; GT215 core; 96 stream processors; 512MB GDDR5; 128-bit memory interface; single slot PCB with active cooling

Card info [www.techpowerup.com/gpuz/6pevg](http://www.techpowerup.com/gpuz/6pevg)

**B**udget cards are just that; cut-down versions of the higher-end cards that we know and love. They're sliced and pulled apart, with bits ripped out to make a more affordable, and most importantly slower, card. The hard part is striking a balance between turfing handy features to reach a good price point, something that Galaxy is attempting with their flavour of GT240.

Based around the GT215 core, essentially a 40nm version of the GT200 (manufactured on a larger 55nm process), it boasts a small complement of 96 stream processors. They're clocked at a relatively sedate 550MHz, and there's a total of 512MB of GDDR5 memory available to them via a 128-bit memory bus. This is an impressive amount of bandwidth for such a cheap card, though at high resolutions with antialiasing it might not prove quite enough for bucketloads of large textures. The die size is a slim 139mm<sup>2</sup>, packing in 727 million transistors that make the GTX285's core look like a behemoth at 470mm<sup>2</sup>. This obviously helps to translate into lower cost, since they can pack a lot of GT215 cores on a single wafer.

Electrically the card commands a maximum TDP of 69W, and thanks to this ultra-low power consumption it doesn't require any external PCIe power connectors, drawing it all from the PCIe slot. Since the heat generated is quite small, the heatsink reflects this with a simple



arrangement of aluminium fins shaped like a flower. A single centrally-mounted fan sits in the centre of the fins, blowing air throughout to exchange the heat relatively easily; but unfortunately it was powered by a two-pin fan cable and whined at an annoying 62.6dBA regardless of the load the card was under. Perhaps this would be ignorable if it was only at load, but this isn't even software-controllable.

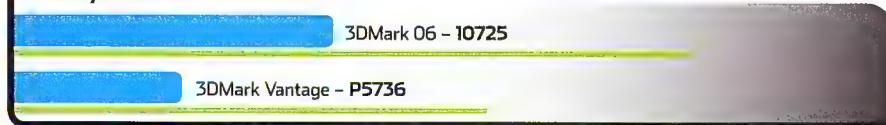
Temps stayed pretty good, with an idle of 35 degrees rising to a maximum of 51 at load. The aluminium frame attached to the heatsink that seemed to be purely visual helped dissipate some additional heat, but the card never felt hot at all. Looks-wise it isn't anything to particularly write home about, but it's nice enough. Dual SLI connectors are the usual fare for NVIDIA cards, but oddly there isn't even a single connector present at the top of the card. Display outputs are quite good, covering HDMI as well as VGA and a single DVI. There's a built-in audio processor in the card that, similar to ATI's cards, enables the digital output of up to 8-channel sound.

Performance wise this card wasn't the most amazing we've seen, though for sheer bang-for-buck it definitely is attractive. While it'll never be able to play Crysis at a decent clip at our test settings, and failed to even run GRID, lower resolutions are perfectly playable as shown by both 3DMark tests. Amusingly it was only 2625 points slower than a 9800GT in 3DMark06, while coming in at \$50 less! Sure you can't run the latest whizz-bang game with face-melting graphics, but it's certainly nice value.

When overclocking Galaxy's offering we found that it couldn't be pushed particularly far, reaching an overclock slightly less than that of Leadtek's GT240. While the core speed increased by a nice 13 per cent, anything over this value would cause the card to throttle at a third of the performance of stock; bumping up the overclock more would crash. Oddly this performance handicap would remain until the system was rebooted, even if clocks were reset.

There's no game included, and considering the card itself is pretty cheap it's a nice choice for a budget gaming box. 

## Galaxy GT240 3d Mark scores



3DMark 06 - 10725

3DMark Vantage - P5736

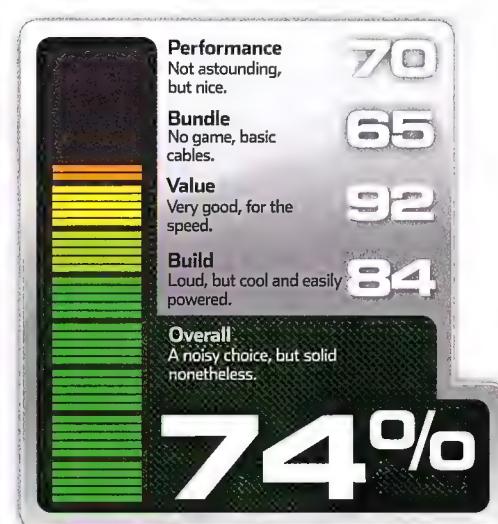
## Galaxy GT240 Gaming Benchmarks



= Reference scores: XFX 5850

Frames per second

atomic



# Manli 5870

Trippy, man...

Street Price \$540 Supplier Bluechip Infotech  
Website [www.bluechipit.com.au](http://www.bluechipit.com.au)

Specifications 850MHz core; 1200MHz memory (4800 effective); RV870 'Cypress XT' core; 1600 shader units; 1024MB GDDR5; 256-bit memory interface; dual slot PCB with active cooling; dual 6-pin PCIe power connector

Card info [www.techpowerup.com/gpu/upq2u](http://www.techpowerup.com/gpu/upq2u)

**M**anli got off to a funny start when we first saw its cards back in Issue 100; not especially bad, but covered with goofy robot mascots that gave the impression it was selling novelty pens as opposed to serious tech. The company's revamped its image since then, and its 5870 is packed into a luxurious folding box that shows off the card pretty well, and certainly has the feeling of quality you'd expect. The card itself is an interesting design, with arbitrary black and white swirls that appear to tunnel inside the card's hard shell. However, looks aren't everything.

Performance here is what most people are really after, which this card can deliver quite admirably. While it is running a full complement of shader units at 1600 total, this is only a small amount over the 5850 (with 1440), and the clockspeed isn't a huge increase. As such we can see increases in Crysis performance as well as 3DMark Vantage (both being incredibly stressful on the GPU), but GRID and 3DMark06 don't show significant improvements at all. This is due to the slight difference in specs, but also due to the memory bandwidth available. 1GB of GDDR5 memory connects through a 256-bit memory bus here, but even this amount of bandwidth caused the core to become starved of data very noticeably in GRID; causing the occasional stutter where the keyboard kept inputting, but the game itself hadn't continued



to move, resulting in oversteering.

Thankfully this limited bandwidth can be somewhat negated by overclocking the memory chips, though we could only increase them six per cent to 1275MHz, a disappointing result. The core seemed to also be limited in overclocking compared to other cards, hitting a nine per cent increase to 930MHz (a GIGABYTE 5870 last issue hit 950MHz). Perhaps not the best overclocking result, but it's still larger than what we recorded from ASUS – your mileage may vary.

What is nice about these high-end cards is that the core can clock itself down to only 157MHz, using very little power and therefore generating a negligible amount of heat. This translates to a fan that barely needs to spin to keep things cool, making only 50.2dBA. In Juggs' words from our forums, "as silent as a 15 year old listening out mid wank". This increases to a loud 62.2dBA at load, almost as loud as the same 15 year old after being

discovered in the act. Temperatures are a little less raunchy, at 43 degrees idle and a hot 66 degrees at load.

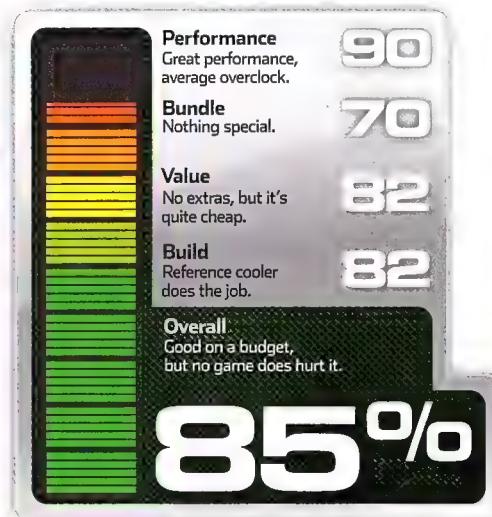
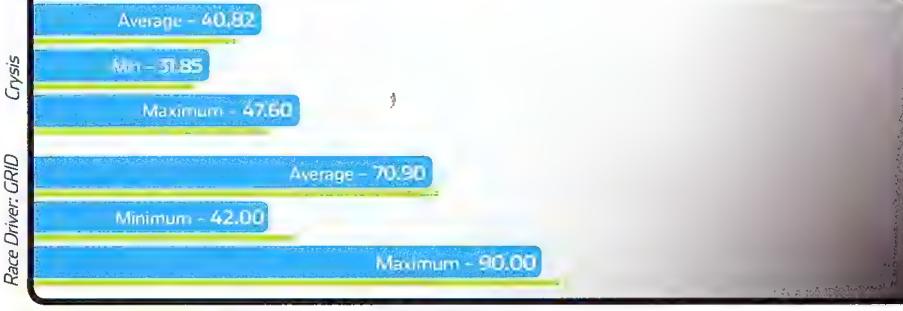
Physically the card shares all the same outputs as most of the cards in ATI's 5xx series, offering two DVI, one HDMI and one DisplayPort connector. Twin Crossfire nipples allow up to four of these babies to work in tandem, and while it might seem like overkill (okay, it is overkill) it's more performance than you'll ever need for years to come. Two 6-pin PCIe power connectors provide the juice that keeps the card running, conveniently placed on the top edge of this very long card – check your case to see if this will fit, since it's so darn huge.

Included with the card is the usual bunch of extras like cables and a driver CD, but unfortunately there is no game anywhere to be found. While Manli certainly is amongst the cheapest offerings of cards in the country, most of them throw in a copy of DiRT 2 (worth a hundred bucks), making this seem a missed opportunity that wouldn't have increased costs by a significant amount. A good choice, if otherwise limited.  JR

## Manli 5870 3d Mark scores



## Manli 5870 Gaming Benchmarks



# A-Data X-series PC3-16000 CL9

For those on a budget.

Street Price \$160 Supplier A-Data  
Website [www.adata.com.tw](http://www.adata.com.tw)

Specifications 2x 2GB kit; DDR3-2000; 8-8-8-26; 1.65V; 240-pin DIMM; Non-ECC Unbuffered DDR3

**A**-Data has been around since the early hours of 2001, and since then the company's firmly seated itself into the budget memory space as one of the major players. Certainly, A-Data's graced the counter of MSY and other ultra-cheap computer stores very often, so if you're in a pinch its RAM is usually there to pull you out of it. A-data's latest kit slots into its Xtreme series, running at a

speedy stock of 2000MHz with 9-9-9-24 timings, with a 2T rate and 1.65V needed for stability.

Annoyingly this stock setting seemed a little too fast for the smallish heatsinks, and the sticks themselves ran noticeably warm under use. This probably won't prove to be an issue in the short term, but we'd prefer them a little cooler for long-term use. At least they manage to look pretty good, and they should fit underneath most large heatsinks.

Overclocking was pretty much a non-event, though we could bump the timings down with a trade-off of clock speed, netting a slightly faster wPrime result at the cost of some bandwidth. It was almost pointless to bother changing the settings, and anything faster would become quickly unstable, so just run them at stock. Considering the price is quite low even with the flash shortage they're a nice buy, but the Ripjaws in Kitlog are better. 



Overall  
Solid memory,  
if un-overclockable.

80%

## A-Data X-series PC3-16000 CL9

	1.65	2000MHz; 9-9-9-24(2T); 1.65V-Stock	2030MHz; 8-8- 8-26(2T); 1.7V
Hexus PiFast	24.45s	24.45s	
wPrime 32M 8x	7.208s	7.146s	
Everest Read	19321 MB/s	17315 MB/s	
Everest Write	16578 MB/s	14083 MB/s	
Everest Latency	37.1 ns	39.8ns	

# HuntKey X7 900W

Shiny and ship-shape.

Street Price \$199 Supplier HuntKey  
Website [www.huntkey.com/eng/](http://www.huntkey.com/eng/)

Specifications ATX Form factor; 24-pin, 2 x 8-pin CPU, 6 x molex, 6 x SATA, 1 x Floppy, 3 x 8/6-pin PCIe, 3 x 6-pin PCIe; 80PLUS Silver.

**H**untKey manufacturers everything from the cheapest PSU in the land (most likely constructed from paperclips and that warm fuzzy feeling you get from a really good hug), computer cases and power supplies – the X7 900W is the latter, and it's definitely not too dodgy. Rocking in at a price of barely \$200 (and coming into the office a shade too late to include in our PSU roundup), it's amongst the cheapest power supply in the 900W power bracket on the entire market, so it has a lot to prove.

Encased in a surprisingly standard ATX-sized chrome casing, there's a huge 140mm fan that sucks in cool air, passing it through a plastic guard that covers half of the intake, a design that forces the air to pass over all the components within the unit. It's modular, with plenty of cables at a decent length, and they're all sleeved in a decent-but-not-amazing plastic sleeving that

keeps them neat and manageable.

The PCIe power cables are odd, with two cables providing two connectors each; one with two 8/6-pin connectors, the other with a single 8/6-pin and a single 6-pin. This is enough to power three high-end cards, and the five 18A 12V rails should be able to handle it with relative ease. We don't leave these things to chance, however, so we threw together an i965, ASUS Maximus Extreme II, as well as a 5970 and a 5870 in Crossfire.

Running the tech gave an idle 12V reading of 12.034V, and a 5V reading of a slightly high 5.132V. We fired up OCCT as well as our Crysly test run, dipping the 12V rail a teensy amount to 12.021V and the 5V to 5.128V – though this dipped to 4.67V for a second or two during high loads. While the PSU heated up at the rear, it remained quiet, and didn't provide any hiccups. It's a nice budget choice, if you've a need for plenty of tech. 



Overall  
Affordable, stable 12V rails,  
5V can wobble somewhat.

85%

# Coolermaster Excalibur

Hark ye knaves! Thar be a fan in our midst!

Street Price TBA Supplier Coolermaster  
Website [www.coolermaster.com](http://www.coolermaster.com)

Specifications 120mm Fan; standard and rubber screws; barometric ball bearing with 100,000 hours MTBF; 3-pin fan to molex included.

Yonks ago you'd be lucky if your case even had a fan in it; the original ATX spec simply had the PSU exhausting all the hot air that was generated from the low-powered rigs of the day. Now, though, you'll be hard-pressed to have a computer that resembles those minimalistic builds, as the IKONIK case on page 48 shows with its insane complement of 13 fans. Sometimes however, you do need a fan that's different to the stock case fans, whether they're too noisy or simply don't move enough air. That's exactly what the Excalibur aims at doing.

Constructed from incredibly light (and flimsy) plastic, the fan has hexagonal cutouts around the perimeter of the frame, giving a larger volume of air that can be sucked in and blown out. The design precludes this fan from being easily used with heatsinks thanks to the pillars between the screw holes at the corners, but that's nothing that cable ties can't fix. Breaking new ground is the Barometric Ball Bearing design, essentially a method of focusing the air pressure within the centre of the motor to keep things stable at high speeds.

And high they get, with a huge 0.45A drawn through the 12V rail, generating a very loud 73.9dBA at load. It's got a PWM cable on it, but this seemed to be ignored as it ran at full speed regardless of temperature. We threw it on our TRUE and recorded some great results, but



the best application for a fan like this is a case exhaust – it moves so much air, you can feel it some feet away.

However it is also dangerously flimsy, and while running it fell onto the edge of a heatsink and promptly shattered one of its blades.  JR

## Coolermaster Excalibur

i7 965 w/ Thermalright Ultra 120 Extreme		Scythe Typhoon, Issue 101 Page 44		Coolermaster Excalibur	
Idle	Stock: 36	OC'd: 38	Stock: 35	OC'd: 38	Stock: 54 (+19)
Load	Stock: 56 (+20)	OC'd: 62 (+24)	Stock: 54 (+19)	OC'd: 61 (+23)	

**Overall**  
It's fast, noisy and breakable. A killer combination.

**79%**

# Razer Orochi gaming mouse

A rodent on the run, from the well-respected game-gear makers.

Street Price \$130 Supplier Audion MM  
Website [www.razer.com](http://www.razer.com)

We have bit of a love-hate relationship with Razer gear. The ubiquitous black-rubber clad, blue-LED lit gaming gear has earned everything from our Epic Fail award to a near-permanent spot in our prestigious KitLog; sometimes the company gets it right, but some of its choices are real klunkers. The new Orochi, a small form-factor mobile gaming mouse seems to truly encapsulate that up-and-down Razer ethos.

Designed with the seriously mobility-concerned in mind, the Orochi features the usual symmetrical Razer form factor, but it has been shrunken down to something that practically fits in the palm of your hand. Curiously, it lacks the usual non-slip rubber coating, instead featuring a combination matte and gloss body. The upper surface bifurcates to create the left and right mouse buttons, and this panel also clicks off to reveal the batteries.

The mouse features both wired and dongle-free Bluetooth connectivity, which is convenient, but also means you'll need built-in Bluetooth to take advantage – this isn't an issue if you're using a modern gaming laptop, but might be if you also

want to use it on your desktop rig. Annoyingly, there's no driver or software disc included with the Orochi; you'll need to download that yourself. That said, once installed it allows convenient macro building, DPI programming, and button remapping, all of which are stored on the mouse.

But to really test the mouse, we turned to our old reliable kill-house level in Modern Warfare (the good one, not the new one). Our stock Razer Lachesis mouse can deliver an adjusted completion time of about 19 or so seconds, give or take. With the Orochi, we immediately noticed one thing – even our tiny Editor-sized hands get real cramped, real fast with the smaller form factor. But performance is king, so we ripped into a session of target shooting.

Oddly, the Orochi performed really well – like two seconds better than our stock mouse, with some incredible accuracy! However, the cost in muscle-fatigue and cramp was high. Not only do you need to assume the worst 'claw' position, but the slick sides of the mouse quickly became greasy, forcing us to grip the mouse even harder whenever we picked it up for fast maneuvering. We typed this review immediately after, and felt quite a few twinges in our wrist from the effort of controlling the Orochi.



Ultimately, while the Orochi is great for its size, we're not sure that performance justifies both the cost, and the loss of comfort. But if you must have a dedicated mobile mouse, this is about the best you can get. Just factor the cost of a chiropractor visit into your purchase!  DH

**Overall**  
Great performance, but horribly cramp inducing.

**78%**

# Viewsonic VG2427WM

Comes with built-in ladder.

Street Price \$310 Supplier Viewsonic  
Website [www.viewsonic.com.au](http://www.viewsonic.com.au)

When we looked at the Viewsonic screen in last issue, we were suitably impressed with its performance. This screen is a few steps up in both price and screen size, with \$310 and a 23.6in panel giving more real estate, though it keeps the resolution at a rather large 1920 x 1080. While it's not the highest pixel/inch ratio we've ever seen, it's still more than enough to appear sharp from a standard viewing distance.

However when we pulled it from the box and first turned it on we found that it was quite dim; a quick boost to contrast and brightness in the functional menu helped immeasurably, and soon we had colours popping off the screen. There was minimal bleed at the edges of the screen on an all-black background, with impressively accurate colour gradients and a decent handling of motion. Text wasn't the most amazing we've ever seen, and some letters appeared slightly blurred towards the edges, though overall it wasn't too intrusive.

Games looked great on the screen, and the

full 1080P resolution matches nicely with the 16:9 aspect ratio for console gamers or movie buffs, though the lack of a HDMI port is an odd oversight. There's DVI and VGA included, as well as a two-port USB hub and some amusingly low-powered 2W speakers. The

whole screen is mounted on an excellent rotating base that can swivel on the spot, and it is height adjustable over an impressive 14cm. Interestingly it even remained quite cool when running, thanks to the 45W power consumption.

There's a huge amount of competition in the 23.6in panel zone, and the VG2427WM comes in at \$100 more than the most basic screens – though for accurate colour, minimal bleed and an excellent stand, this premium price is definitely worth paying. 



Overall  
Very adjustable screen, just a little too expensive.

83%

# Patriot Viper2 'Sector 5' PC3-16000 CL8

Memory with a serious byte.

Street Price \$225 Supplier Patriot  
Website [www.patriotmem.com](http://www.patriotmem.com)

Specifications 2x 2GB kit; DDR3-2000; 8-8-8-26; 1.65v; 240-pin DIMM; Non-ECC Unbuffered DDR3

Rocking in at an inflated price of \$225 (thanks to the worldwide flash shortage going on) is a 4GB kit of Patriot memory made especially for Core i5. The Sector 5 consists of two sticks of memory at 2GB each, running at zippy stock speeds of 2000MHz at 8-8-8-26 2T timings. 1.65v is required to run this speed, which is a relatively standard voltage, and the highest that the official Intel spec demands.

## Patriot Viper2 'Sector 5' PC3-16000 CL8

1GB	2000MHz; 8-8-8-26 (2T); 1.65V - Stock	2030MHz; 8-8-8-26 (2T); 1.7V
-----	---	------------------------------------

Hexus PiFast	24.52s	24.21s
wPrime 32M 8x	7.176s	7.051s
Everest Read	19748 MB/s	19575 MB/s
Everest Write	16605 MB/s	16841 MB/s
Everest Latency	35.6 ns	36.1ns

Looking like something you'd comb your hair with (assuming you need an industrial-strength aluminium hair organiser), the sticks are cooled on each side with black anodised heatsinks. The PCB is black too, helping the Viper2 sticks to look pretty awesome, and they've got the standard 240 pins that DDR3 memory is known for. Stock speeds are pre-programmed in a handy XMP profile that uses some of the extra bit of space on each stick, allowing quick setting changes in the BIOS.

Performance at stock speeds was understandably good, netting a fast PiFast result thanks to the high bandwidth and a good wPrime result as well. Overclocking wasn't amazing however, as we only managed to eke out an extra 30MHz from the sticks – and even then Windows would BSOD when we told it to restart or shut down. A solid choice at stock, but expensively priced and poor overclocking prowess means that there are other sticks we'd pick. 



Overall  
Expensive, poor overclockers, though fast at stock.

81%

# NRG Typhoon

The latest from NRG hits a perfect gaming sweetspot.

Street Price \$1749 Supplier Altech  
Website [www.altech.com.au](http://www.altech.com.au)

Specifications Intel Core i5 750 @ 3.8GHz; Corsair 4GB DDR3; GIGABYTE P55M-UD4; 1TB HDD @ 7200rpm; DVD burner; 550W Antec PSU.

With the recent releases of some pretty tempting tech and the relatively strong Aussie dollar we're starting to see some high-powered rigs that come with smaller price-tags – and the Typhoon is a stellar example of this. It's designed to within an inch of its life to be exactly what is needed and not a step beyond; though considering the specs this isn't disappointing.

Packed into the Antec Mini P180 case is a MATX GIGABYTE P55M-UD4, which we thought was so good we put it into Kitlog. Powering the system is a Core i5 750, the best value chip you can grab, and it's been pre-overclocked to 3.6GHz. This overclock is kept very cool by the Zalman CNPS10X Extreme heatsink; with a 120mm fan mounted on it, the case's 120mm and the 200mm exhaust fans channel air right around the heatsink; heat is sucked away very quickly.

Memory needs are filled with a pretty standard Corsair kit, running at a slightly slower 1440MHz thanks to the CPU overclock. Graphics are fulfilled by a single GIGABYTE 5850, a nice value/performance choice. While it's possible to run Crossfire (or SLI) on this mobo, you'll be restricted both by limited space and PCIe lanes, though a single card should be more than enough power in most cases. You can't even add in a longer card than this without removing the HDD cage, so you're getting the most for the available space here.

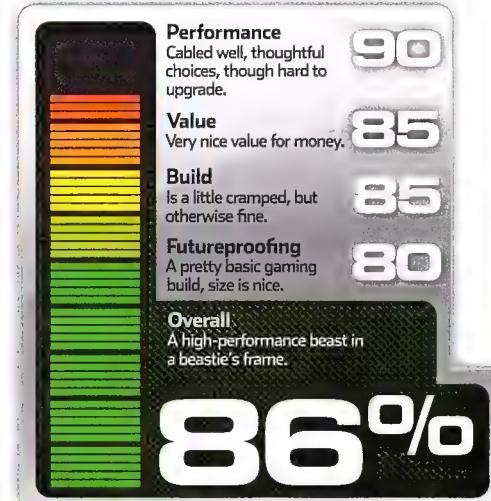
Storage needs are taken care of by a single Seagate Barracuda 72100.12 1TB HDD, a relatively fast mechanical drive that offers decent value with plenty of storage space. We'd like to see another drive thrown in here too, but that is an optional extra (and therefore more money). Pumping electricity to every component is an Antec TruePower 550W PSU, a decent choice for both noise and reliability. All these components band together to provide a very high performance in our benchmarks, taking P13,922 points in Vantage and a high 21,531 points in 3DMark06. Impressively, the Typhoon could run Crysis at 1920 x 1080 with 4xAA on Very High and still manage an average of 22.5fps. While this isn't quite a playable framerate, with AntiAliasing turned down (or off) it shouldn't be too bad.

So performance is great, and the design of the build is very nice, but there are some minor problems. While everything is cabled neater than a clean-freak in a vacuum, any upgrading will be a major headache, involving completely ripping out most of the cables and components just to add in HDDs.



If you're hoping to add in more than an extra drive think again; there's not much space in the middle HDD cage with the graphics card there, and the lower cage is tricky to access without removing the PSU first.

If you're happy with the specs you'll be more than happy with the performance, all wrapped up with great value. Not for the tweaker, but perfect for any gamer. 



# Silverstone SST-FT02B-W

Silverstone keeps turning the PC building world on its side – and we like it.

**Street Price** \$300 **Supplier** Altech Computers  
**Website** [www.silverstonetek.com](http://www.silverstonetek.com)

**Specifications** 212 x 497 x 616mm (W x H x D); 15kg, 5x 5.25in drive bays, 5x 3.5in drives bays, 1x 2.5in drive bays; 1x 120mm exhaust fan (top), 3x 180mm intake fans (bottom); 2x USB 2.0, 1x audio, 1x mic; ATX & mATX; aluminium frame, steel body.

If you like the topsy-turvy philosophy behind Silverstone's recent Raven cases, but don't like the Stealth bomber looks, the new FT02 series might just be the very thing you're after. Featuring the hard rectangular edges and curved accents of much of the rest of Silverstone's range, this new case hits a real sweet spot between classic design and innovative ideas.

If you're unfamiliar with the Raven, here's a précis of the design ethos: imagine the normal layout of the motherboard in a case; now place the board on the opposite side of the case, and rotate it so the expansion slots point upward. It might sound random, but when you think of one of the basic properties of hot air – that it rises – you start to see the advantages.

Silverstone's gone a step further and is giving nature a real boost with an awesome cooling setup. Three 180mm fans suck cool air in from the bottom, while a single golf-ball-dimpled 120mm fan assists in pushing hot air out at the top. It's up here that all your cables attach, too, so there's a detachable mesh panel that channels the cables out a slot at the top of case's rear. What you end up with is great air flow, supremely neat external cable management, and an overall elegant design.

The front fascia is restrained in its design, featuring just panels for the five external drives, and a Silverstone badge. The upper and lower edges curve back under the case, providing

an inch of clearance for the main body – this helps a lot with the air intake for those three lower fans. The case's rear is alarmingly plain, too – with all the action on the case-top, all you'll find here is a removable filter that keeps hairballs out of the PSU (which mounts on the upper rear panel internally). The right side-panel features a window, and with such a unique build state internally, this is definitely something we like. What's more, if – like some of us – you prefer your case to the left of your workstation, this actually means you can finally take advantage of a windowed case. Win!

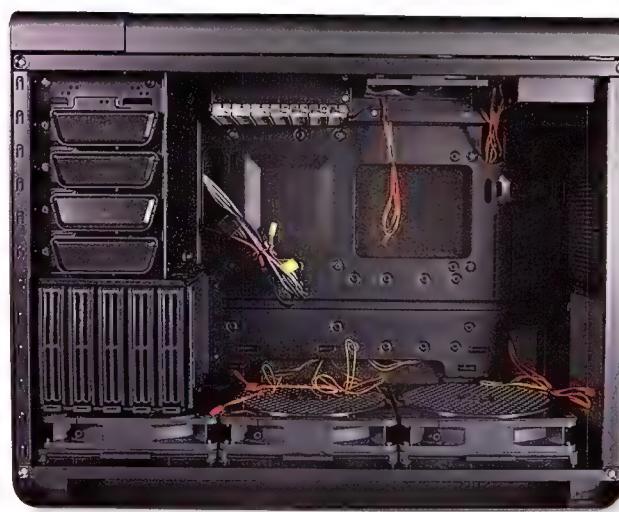
The internal build quality is almost without fault. All the lower fans feature removable filters, the drive bays are all tool-less (with optional screws for the 5.25in bays if you really want them), and the expansion slots are roomy and rely on old-fashioned screws – which is pretty much our preference for heavy video cards anyway. The mobo backing plate has heatsink cut out, and pretty solid cable management options; plus there's good room behind the plate to hide cabling away entirely. Two particularly cool touches are a single hot-swappable drive enclosure, and a dedicated SSD bay.

Our only niggle is the odd choice to only cover two of the three 180mm fans with a meshed cover. The fan under the drive bays is partly open to the interior, and since gravity is such a harsh mistress, we expect loose cabling and dropped screws to unerringly find its way



into this spinning maw of doom.

Slasher fears aside, the crowning glory of the FT02 is its lack of noise. Each panel is treated to sound dampening foam, the bottom fans are all switchable from high to low rotation, and at low speed all the fans are rated for 18-19db. For something that's obviously aimed right at performance gamers, this is great stuff; if you then kit out your rig with known quiet gear, you should have a perfect system for adding a good 5.1 speaker system to for glorious gaming noise. And quiet's just cool all by itself. For a unique, well-cooled and quiet gaming machine, there's few cases better than this one. 



## Build

Solid and sturdy, all anodised interior.



## Value

A good price for some great features.



## Cooling

Hot stuff in the cooling stakes.



## Features

A very well executed design.



## Overall

A great choice for an innovative building project.

**89%**

# IKONIK Ra X10 Liquid

Wet and wild.

Street Price \$450 Supplier IKONIK  
Website [www.ikonik.com](http://www.ikonik.com)

**Specifications** 220 x 572.3 x 606mm (W x H x D); 2 x 120mm fan (front intake); 1 x 140mm fan (rear exhaust); 2 x 80mm fan (rear exhaust); 8 x 80mm fan (4 lower intake, 4 higher exhaust); 6 x 5.25in drive bay (external); 8 x 3.5in drive bay (internal); EATX, ATX, M-ATX; Aluminium; included watercooling.

**Gallery** [www.atomicmpc.com.au/?162455](http://www.atomicmpc.com.au/?162455)

Computer cases haven't really changed much in the many years since you first brought home that dull beige box that housed your very first computer, with features added in fits and spurts over a course of many months. The process usually involves one manufacturer designing a whiz-bang must-have feature; and the rest of them slowly incorporating that same feature into their own designs, as seen with the window panels and holes-through-the-mobo-tray for installing heatsinks. However, recent startup IKONIK has thrown its research and development team not into what they can copy better, but rather what they can actually *design better*, resulting in the Ra X10 you see before your very eyes.

From the exquisitely curved and shaped piece of 3mm thick aluminium that forms the fascia to the mind-boggling amount of features packed in, this is perhaps one case



that actually rivals the Thermaltake Level 10 for sheer volume of cool stuff. Externally it is anodised completely black, and while the front is aluminium the rest is treated to a more standard (and cheaper) 1.2mm thick steel. This is a little flimsy compared to the front door, and indeed flexed more than an oiled-up bodybuilder at a lady's night. The case is physically very imposing, filling in at a size that could swallow most other cases and keep on going. It's got four extendable feet at the

Moving to the side of the case shows off the giant meshed sidepanel. While it isn't filtered, most bigger objects such as hair will be stopped, and IKONIK even throw in a replacement acrylic panel so you can turn it into a window! The sidepanels, however flimsy they are, are held on to the case with three thumbscrews each and quick-release buttons,

**[the water cooling systems is] so integrated into the design that that it almost appears the case was built around it!**

bottom that help to balance the case.

At the top of the case lies the first sign that it is created specifically for getting wet; a small pinwheel is mounted behind a plastic window that lights up bright blue when powered up, showing the flow of water in a very neat way. Just behind this lies the I/O panel that covers every port you'd want – mic/audio jacks, four USB, 6-pin Firewire and two eSATA ports. The power button is firm and responsive, with a nice amount of travel and a solid return.

giving access into the guts of the case – where the real excitement lies.

Packed into this vast, cavernous space is a motherboard tray that supports up to EATX motherboards, room for six 5.25in drives as well as eight 3.5in drives and, most importantly, the watercooling system. This is the most interesting part of the entire case, but even saying that is difficult – it's so integrated into the design that it almost appears the case was built around it!



Beginning at an aluminium reservoir and pump combo mounted at the bottom of the case, which is filled with the included blue coolant, liquid is pumped through to the copper waterblock. Compatible with sockets LGA775, LGA1136, AM2 and AM3, this waterblock is a relatively simple design that utilises a small forest of copper pins through which the water is forced, exchanging heat over the large surface area this affords. While the base is a bit rough and the finish imperfect, it's decent when considering that the price of a high-end waterblock can be over \$90 alone. From the CPU, the heated liquid flows to the top of the case, passing through a 320 x 80mm radiator that itself is cooled by a whopping four 80mm exhaust fans! It then flows from the radiator to the pinwheel, and from there heads down to the bottom of the case – where it enters another radiator that has four 80mm fans intaking cool air. Only when the liquid has

passed through all these stages is it deposited back within the reservoir, and the entire system has a cooling capacity of 500W – plenty for an overclocked CPU and a pair of GPUs.

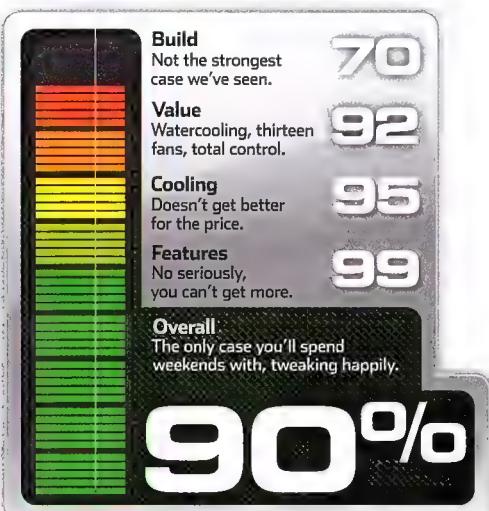
Not only are the CPU and any other components you add to the loop cooled by the eight 80mm fans, but the remaining bits such as the mobo and hard drives are fed plenty of fresh air by the two 120mm intake fans, the single 140mm rear exhaust fan and yet another two 80mm rear exhaust fans. Considering you're getting an entire watercooling system, a case and thirteen bloody LED fans, the price of \$450 starts looking like a bloody bargain.

Even without the cooling loop there are a lot of things to like about the case; every HDD mount is vibration damped (as well as the rails where the PSU sits), there are eight expansion slots for crazy four-way Crossfire (or just fan controllers) and even the 5.25in bays have toolless securing. Where IKONIK has



done something different here is something that NVIDIA tried to do with its Enthusiast System Architecture, a failed hardware-dependant implementation of monitoring. IKONIK has created its own system of both monitoring component temperature and controlling the speed of fans – allowing complete software management over the amount of noise generated, which you can even specifically tailor depending on temperatures within the case. In other words, the fan rotation speed. Every single fan is pre-wired to this control box (which simply needs one power cable), and every watercooling component is pre-connected (simply needing electricity and liquid).

While there are a few small niggles concerning the rest of the case's build strength, so long as you don't LAN too much with it this is hands-down the most innovative case the industry has seen for years – and the best value case money can buy. 



# Power houses

James Gorbolt and Antony Leather test PSUs like no other to bring you the very best.





**P**ower. Without it, none of our precious electronic goodies would function; we'd be left stranded in a cold nothingness, an empty void bereft of television's warm glow or the steady thrum of a fan-filled PC. Thankfully that's why the power supply was invented (along with all those other handy things that let us use electricity), but as with any component they are not all made exactly equal.

With that in mind, we've assembled sixteen of the handy little boxes into a giant pile, slowly working through until we uncover the best of the bunch. Our testing methodology

(outlined on the next page) is rough, our two testers mean and not every power supply will live through the ordeal.

Some of them have modular cables; others hardwired. Some of them run perfectly; others got fried. Some of them buzz merrily, and others without a care. In the end, and all throughout, it's a powerfully important affair.

When all is said and done though, you'll be armed with all the knowledge you have to have if you ever want to build a new computer of any power level. From the enthusiast power user, gamer on a budget or even the power supply philanthropists out there, the coming pages will supply all your needs...

# How we tested

## What a PSU does

A PSU is simply an AC to DC converter that converts the 230V AC (alternating current) supplied by the mains to the DC (direct current) voltages required by all the components inside a PC. A typical PSU for a desktop PC must output five different voltages, known as rails, which are 3.3V, 5V, 12V, -12V and 5V standby (5VSB).

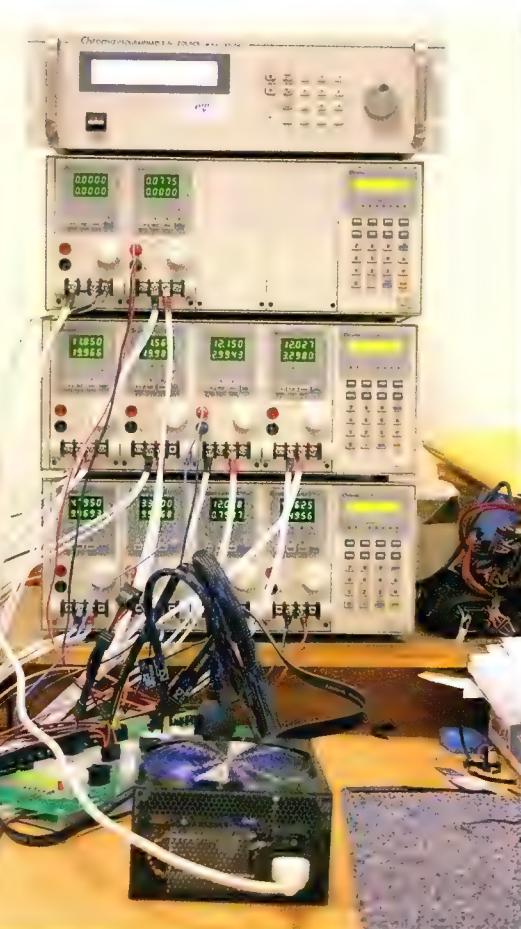
## What to look for

For most mid-range PCs with a couple of hard disks and optical drives, a single graphics card and a mid-range CPU, a PSU of between 350W and 500W will suffice. However, if you're building a high-end system with dual graphics cards and a multicore CPU, you need to think about buying a more powerful PSU.

Aside from power, you also need to consider which connectors your PC needs. All new motherboards use a 24-pin ATX connector, for example, whereas older motherboards use 20-pin ATX connectors. In other words, if you're upgrading from an old system (a couple of years old or more) then it's worth checking the features carefully, as most high-end PSUs don't support 20-pin motherboards. It's possible to buy adaptor cables

that convert the 24-pin connection to the older 20-pin connection, but you'd have to buy this separately. In addition, many high-end motherboards also have 8-pin EPS12V connectors instead of the older 4-pin ATX 12V connectors, so you need to make sure the PSU you buy supports your motherboard. Some dual-processor motherboards, such as the Intel D5400XS (Skulltrail), even have two 8-pin EPS12V connectors, which very few PSUs support.

Selecting an appropriate PSU is made all the more difficult by the fact that the limited information many manufacturers provide really doesn't tell you how good the PSU is. Sure,



each PSU is rated as capable of outputting a certain wattage (600W, for example), but this doesn't tell you much, as many manufacturers list the wattage in an extremely confusing way.

Many manufacturers simply add up the wattage over the primary rails (3.3V, 5V and 12V) and list this as the total. However, no PSU is capable of simultaneously producing its maximum wattage from each rail, so this method gives an overly generous impression of the PSU's capabilities. Make sure you read the label carefully when looking to see how many watts a PSU can produce in parallel on each rail. More importantly, check the current rating on the 12V rails, as these power the CPU(s) and graphics

card(s) – two of the most power-hungry components in a modern PC.

Unfortunately, even closely scrutinising the label won't tell you anything about voltage stability, which is probably the most important factor in a PSU. Producing a stable voltage on each rail is a pretty tough task, and some PSUs simply aren't up to it. Voltage stability is important because some components may not start up if the voltage is too low, or could burn out if the voltage is too high. You certainly don't want to risk damaging your new CPU or graphics card, just because you bought a nefariously labelled PSU.

Fortunately, the Intel ATX spec, which you'll find at [www.formfactors.org](http://www.formfactors.org), lays down in black and white the physical and electrical characteristics a PSU must follow. If you've read our previous PSU Labs tests, in which we discovered plenty of PSUs that failed to make the grade (including several that failed to work at all), you'll be pleased to hear that our rigorous testing procedures have compelled manufacturers to improve the quality and safety of their latest PSUs. That said, a significant proportion of the models we tested this year still failed some of the voltage stability tests and two of the PSUs blew up, so there's clearly still a lot of work to be done.

According to the ATX spec, there can be a maximum variance of 5 per cent above or below the voltage on the 3.3V, 5V and 5V standby rails, and a variance of up to a 10 per cent on the -12V rail. For the 12V rails, the voltage can vary by up to 5 per cent at typical load levels, but at full load it can vary by as much as 10 per cent. To save you having to work this out for yourself, we show the minimum and maximum voltages for each rail in the table below.

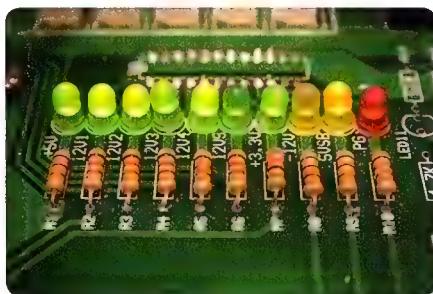
## How we tested

As PSU test equipment is highly specialised, we used a third-party lab – with some seriously stressful hardware – to conduct our tests. This enables us to use the latest generation of PSU testing equipment. By using the combination of a Chroma 6314 load tester and Chroma 61604 power supply, we were able to measure the voltage stability, overall efficiency and PFC efficiency of each PSU.

To test each PSU, we programmed the load testers to drain the amount of power that each manufacturer claims its PSU can deliver. We measured the voltage of each rail at 50 and 100 per cent load to determine if it was within the ATX spec. We then left each PSU running at 100 per cent load for 30 minutes to determine

### ATX spec: Minimum and Maximum voltages

Rail	Variance	Minimum	Maximum
3.3V	5 per cent	3.14V	3.47V
5V	5 per cent	4.75V	5.25V
12V	5 per cent	11.4V	12.6V
5VSB	5 per cent	4.75V	5.25V
-12V	10 per cent	-10.8V	-13.2V



whether it could produce stable voltages over an extended period.

Let's take the FSP Epsilon 85PLUS 600W as an example. FSP claims that it can output 30A on the 3.3V rail and 30A on the 5V rail, but together these rails can output no more than 140W. It also has four 12V rails, each rated at 18A, with a maximum combined output of 48A, a 0.8A -12V rail and 3A 5VSB rail. This meant we had to carry out 32 individual measurements to find out if it meets the ATX spec (see Test Sheet). As the test results clearly show, the PSU's 12V rails struggled to output their full claimed 48A, and their output dropped below the 11.4V minimum requirement of the ATX specification on two occasions (highlighted in red).

An area of increasing interest is the overall efficiency of the PSU, or how much power it draws from the mains to supply the requested load. Efficiency is very important because any wasted energy is dissipated as heat. This must then be expelled by the cooling system, otherwise the electronic components inside the PSU will become less effective and the PSU might even burn out. For example, many PSUs can only provide their claimed output at temperatures between 25°C and 40°C; if they become any hotter, their output drops. This means that a less efficient PSU requires a more powerful and noisy cooling system. An efficient PSU, on the other hand, will run cooler and draw less power from the mains, which will help to reduce your electricity bill. The ATX spec cites that at full load a PSU should be at least 70 per cent efficient. As you can see from the Test Sheet, the FSP Epsilon 85PLUS 600W is very efficient, with an average efficiency of 88 per cent at full load, which means it draws 680W from the mains to produce 600W. However, it is slightly less efficient at 50 per cent, with an efficiency of 85 per cent.

It's also important to test the efficiency of a PSU's Power Factor Correction (PFC) circuitry. The PFC helps to reduce uneven harmonics in the incoming current, which in turn helps to reduce the PSU's power consumption. We measured the PFC efficiency during each of the load tests, an example is shown in the Test Sheet.

## The scores

There were several hundred measurements to analyse, but we made the process slightly easier by using the ATX spec as a guide.

The voltage stability tests take pride of place in the scoring box and account for 50 per cent

### Test sheet for FSP Epsilon 85Plus 600W

#### TEST 1: 50 per cent load, input 356W, output 300W, efficiency 85 per cent, 94 per cent PFC

Rail	3.3V	5V	12V1	12V2	12V3	12V4	-12V	5VSB
Amps	10A	5A	5A	5A	5A	5A	0.4A	1.5A
Power	33W	25W	60W	60W	60W	60W	4.8W	7.5W
Actual voltage	3.35V	5.01V	11.88V	11.87V	11.94V	11.85V	-11.88V	4.9V

#### Test 2: 100 per cent load, input 664W, output 600W, efficiency 90 per cent, 96 per cent PFC

Rail	3.3V	5V	12V1	12V2	12V3	12V4	-12V	5VSB
Amps	1A	1A	18A	18A	8A	3.92A	0.8A	1.42A
Power	3.3W	5W	216W	216W	96W	47W	9.6W	7.1W
Actual voltage	3.36V	5.16V	11.42V	11.34V	11.66V	11.61V	-11.62V	4.89V

#### Test 1: 100 per cent load, input 664W, output 600W, efficiency 90 per cent, 96 per cent PFC

Rail	3.3V	5V	12V1	12V2	12V3	12V4	-12V	5VSB
Amps	1A	1A	8A	3.92A	18A	18A	0.8A	1.42A
Power	3.3W	5W	96W	47W	216W	216W	9.6W	7.1W
Actual voltage	3.36V	5.16V	11.56V	11.6V	11.54V	11.28V	-11.61V	4.89V

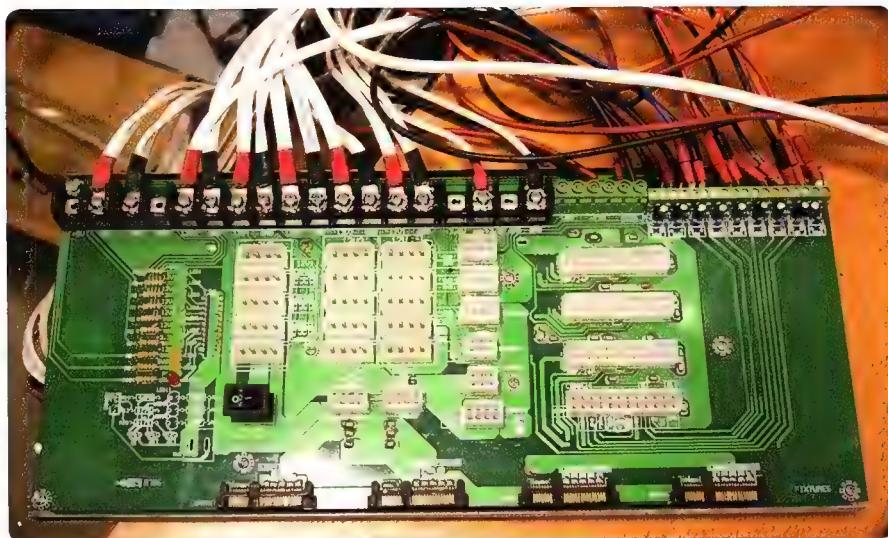
#### Test 1: 100 per cent load, input 680W, output 600W, efficiency 88 per cent, 97 per cent PFC

Rail	3.3V	5V	12V1	12V2	12V3	12V4	-12V	5VSB
Amps	10A	5A	10A	10A	10A	11A	0.8A	3A
Power	33W	25W	120W	120W	120W	132W	9.6W	15W
Actual voltage	3.33V	4.88V	11.69V	11.66V	11.81V	11.6V	-11.77V	4.9V

of each PSU's overall score. The scores show the number of test measurements that are within the limits of the ATX spec, converted into a percentage to allow PSUs with a different number of rails to be compared.

Obviously, we recommend that you only buy a PSU that has perfect (100 per cent) stability. Unfortunately, we don't have room to print all the voltage stability measurements, but each PSU has their strong and weak points mentioned in detail.

The Features score includes the overall efficiency and PFC efficiency as measured in the 50 and 100 per cent load tests, plus the number, type and quality of the cables and how noisy the cooling fan(s) are at 100 per cent load. The Value score is a combination of the Stability and Features scores and the total output (in watts) divided by the price. These three scores added together give the PSU's Overall score. Read on to see what is our unit of choice.



## Arctic Cooling Fusion 550R

Dangerous and explosive – two things a PSU should never be

Street Price \$95 Manufacturer [www.arctic-cooling.com](http://www.arctic-cooling.com)

Arctic Cooling is perhaps best known for its Freezer range of CPU coolers. If you take a peek under the bonnet you'll find the same Seasonic PCB in the Fusion 550R as is in Seasonic-branded PSUs. However, while the Fusion 550R is rated at 550W, most of this is generated by two 12V rails, each rated at 17A. These are configured so that 12V1 powers the motherboard, disk drives and two 6+2-pin PCI-E cables while 12V2 is dedicated to the CPU.

While other units are cooled by a 120mm fan mounted underneath, the Fusion 550R has a single 80mm fan mounted on the outside

of the case on a flimsy plastic and rubber frame. Not a good position for the fan as lots of air gets blown outside, rather than inside the case.

Although the Fusion 550R worked without a fault at 50 per cent load, it failed to produce 550W. At full load, the output from its 3.3V rail continued to drop, and after just four minutes and 12 seconds, by which time it had dropped to 2.2V, well below the 3.14V minimum of the ATX spec, the PSU made a nasty burning smell and switched off – permanently.

The ineffective and quite possibly dangerously positioned fan would be enough for us not to recommend the Fusion 550R on its own, but given that it also blew up we can't stress enough how much you should avoid the 550R.  JG



### Overall

Not worth buying, even to watch it burn.

**14%**

## Cooler Master Real Power M1000

Expensive, offensive and unattractive.

Street Price \$320 Manufacturer [www.coolermaster.com](http://www.coolermaster.com)

Curiously, most of Cooler Master's high-end PSUs come with captive, as opposed to modular, cables. The Real Power M1000 is an exception, and is the company's highest-rated PSU to have modular cables.

Given its name, it's not surprising that the Real Power M1000 has a maximum claimed output of 1kW. This is split across six 12V rails plus the usual assortment of 3.3V, 5V, -12V and 5VSB rails. 12V1 and 12V2 are each rated at 18A, 12V1 powering the motherboard and half of the CPU, while 12V2 powers the rest of the CPU. 12V3 and 12V4 are each rated at 28A and between them power the

two 8-pin and two 6-pin modular PCI-E cables, while 12V5 and 12V6 are each rated at 18A and have responsibility for the disk drives. A 135mm temperature-controlled fan cools the interior, but the motor makes an nasty grinding noise.

The Real Power M1000 easily supplied 500W at 50 per cent load, but we could only draw 990W from it before it switched off. After running at 990W for a few minutes we noticed an unpleasant smell, and as we were reprogramming the Chroma for the 30-minute stress test, the PSU belched a cloud of smoke and died.

A 1kW modular PSU for \$320 should be decent, but unfortunately the Real Power M1000 is a real stinker. Unless you like burnt components you should definitely avoid.  JG



### Overall

No-one likes a heavy smoker.

**22%**

## FSP Everest 85PLUS 800W

Computers beware.

Street Price \$315 Manufacturer [www.fspgroup.com.tw](http://www.fspgroup.com.tw)

The Everest 85PLUS 800W belongs to one of two new series of PSUs FSP launched in the second half of 2009. The only real difference between the two series is that the Everest PSUs are equipped with modular cables, while Epsilon uses captive cables.

The 800W model in the Everest series has four 12V rails, which are configured so that 12V1 powers the CPU, 12V2 supplies the first two PCI-E connectors, 12V3 powers the motherboard and disk drives and 12V4 powers the final two PCI-E connectors. For this reason, both 12V1 and 12V3 are rated at up to 20A while 12V2 and 12V4 are each

rated at up to 25A. The maximum combined output for all four 12V rails is 773W, or 64.4A.

As we've already hinted, the Everest 85PLUS has four 6+2-pin PCI-E connectors. It's cooled by a relatively quiet 120mm fan, although the bearings inside the fan make an annoying ticking noise at maximum speed under load. The Everest 85PLUS performed admirably at 50 per cent load, but its 12V rails proved incredibly puny.

At full load the output from these rails dropped to well below the 11.4V minimum requirement of the ATX spec, which would likely cause your computer to crash. For example, 12V1 dropped to 11.19V, 12V2 to 11.08V, and 12V3 to 11.37V. This is a terrible result for the Everest 85PLUS and means that we can't recommend it.  JG



### Overall

12V crashing is never a good idea.

**45%**

## FSP Epsilon 85PLUS 600W

Cool, quiet and efficient, but the 12V rails are terrible.

Street Price \$169 Manufacturer [www.fspgroup.com.tw](http://www.fspgroup.com.tw)

The Epsilon 85PLUS is part of a new range of mid-range PSUs that FSP will launch later this year. As the name suggests, these new models improve on previous Epsilon models with a claimed efficiency of at least 85 per cent.

Although this makes the Epsilon 85PLUS 600W much cheaper than the Everest, the large number of cables will clutter up the inside of your PC, reducing airflow and thereby increasing the temperature. The Epsilon 85PLUS has four 12V rails, each of which is rated at up to 18A, with a maximum combined output of 46A. Hardwired into the main cable loom are one 6+2-pin and one 6-pin PCI-E

power cable to support the latest and greatest graphics cards. A relatively quiet, but humming, 120mm fan keeps the inner workings cool.

The Epsilon 85PLUS proved to be rock solid at 50 per cent load, but none of the 12V rails was capable of outputting a stable 18A at full load without the voltage dropping considerably, no matter which one we stressed. Unfortunately, the drop was so severe that the output, 12V2 at 11.34V and 12V4 at 11.28V, was well below the 11.4V minimum requirement of the ATX spec. However, the Epsilon 85PLUS was very efficient, managing a score of 90 per cent at full load.

Despite the Epsilon 85PLUS's noteworthy energy-efficiency, it's impossible to recommend, thanks to its weak 12V rails. 



Overall  
Fails to meet ATX spec, do not want.

**47%**

## Cooler Master Silent Pro M600

Very quiet, but weak with 5V.

Street Price \$145 Manufacturer [www.coolermaster.com](http://www.coolermaster.com)

Cooler Master has made some very impressive products over the years, such as the ATCS 840 and Stacker series of cases, so we were keen to put some of the company's PSUs to the test. The Silent Pro M600 is rated at 600W and, like the Real Power M1000, features modular cables to aid cable tidyng.

Its single 12V rail is rated up to 40A and has two 6+2-pin PCI-E connectors, so it can power a single high-end graphics card or a pair of mid-range cards. It comes with a healthy number of additional connectors, with five Molex plugs and nine SATA plugs. Unfortunately the Silent Pro M600 didn't fare

particularly well in our tests, and failed three of them. At 50 per cent load the Chroma reported that the 5V rail was supplying 4.68V; the ATX specification requires a minimum of 4.75V, so the Silent Pro M600 was worryingly outside this limit. The situation was worse at 100 per cent load, where the reading dropped further to 4.61V. Even at 100 per cent load, however, the Silent Pro M600 is quiet, as its 135mm fan produces very little noise. It makes a slight low-frequency humming noise, but this shouldn't be audible outside most cases.

As it stands, the Silent Pro M600's weak 5V rail could damage USB devices or worse; making it impossible to recommend, despite the low cost, modular cables and quiet cooling. 



Overall  
Modular, quiet, but 5V is a huge let down.

**61%**

## Corsair CX400W

Cheap and cheerful, but 400W isn't much wiggle room.

Street Price \$95 Manufacturer [www.corsair.com](http://www.corsair.com)

Corsair took the PSU market by storm when it entered the fray in 2006 with a combination of in-house and Channel Well/Seasonic designs. In addition to this lowly 400W power rating, which many users will find inadequate, the CX400W provides only a single 6+2-pin PCI-E connector and captive rather than modular cables. It also has just six SATA and six Molex connectors, and its single 12V rail is rated at 30A. This might all sound a bit stingy, but the CX400W is far cheaper than any other branded PSU and barely any more expensive than a generic 'blow up in your face' unbranded PSU.

On the plus side, the CX400W took everything the Chroma could throw at it and came out unscathed, producing its full 400W without a hitch. However, although the fan isn't too noisy at 50 per cent load it gets really quite intrusive at full load. At 50 per cent load it was 85 per cent efficient, falling slightly to 84 per cent at full load. While most other branded PSUs are more efficient than this, the CX400W is a lot more efficient than most generic unbranded PSUs. The CX400W is cheap, but 400W isn't really enough to run an overclocked high-end system comfortably. Its cooling fan is also quite noisy, especially at full load. The fact that it passed all our tests is commendable, given that most similarly priced generic PSUs are little more than firecrackers. 



Overall  
Affordable for lower-end rigs.

**78%**

## OCZ Fatal1ty 700W

Stable rails, but not modular.

Street Price \$165 Manufacturer [www.ocztechnology.com](http://www.ocztechnology.com)

OCZ has expanded into numerous hardware markets in recent years and now sells PSUs as well as memory, waterblocks and a brilliant range of SSDs. The Fatal1ty 700W, named after the pro-gamer Johnathan Wendel, features captive rather than modular cables and, unlike most of the other PSUs in this Labs test, has a single 12V rail rated at up to 56A. Multiple rails are arguably safer in the unlikely event that the PSU fails, but a single rail is cheaper to make and more power efficient. With a single rail you also don't need to worry about overloading it by connecting the wires incorrectly. The PSU provides two 6+2-pin

PCI-E, eight SATA and eight Molex connectors.

Like the OCZ ModXStream Pro 500W, the Fatal1ty 700W passed all our stability tests. However, while the 120mm fan was quiet at 50 per cent load, there's a high-pitched whine coming from one of the coils inside the PSU. Its efficiency was 82 per cent at this load level, which is rather poor for a relatively new PSU.

It was slightly more efficient at full load with a score of 84 per cent, but this is still a little low.

Stability is the primary consideration when buying a PSU, but low noise, efficiency and modular cables are also important. While the Fatal1ty 700W didn't live up to its name and kill any members of staff, we are reluctant to recommend it due to the coil whine.  AL



### Overall

A decent buy, but loud at load.

**79%**

## Corsair TX850W

Very stable, but loud and hot.

Street Price \$85 Manufacturer [www.razerzone.com](http://www.razerzone.com)

The Corsair TX850W doesn't have a particularly memorable name, but from previous experience we know that the TX series sits halfway between the budget CX and premium HX series. The TX850W didn't impress us when we took it out of the box. Captive cables on a modern 850W PSU are not ideal, as the inside of your PC is likely to be riddled with lots of unused cables.

The TX850W has a single hefty 12V rail, which is rated up to a scary 70A. A single powerful 12V rail such as this one is cheaper to implement and more power efficient than multiple lower-wattage 12V rails, but it's also

potentially more dangerous if the PSU suffers a catastrophic failure. In addition to the four 6+2-pin PCI-E connectors, the TX850W also provides eight SATA and eight Molex connectors, which is ample for even the largest RAID arrays.

The TX850W passed all our stability tests, with the output from all its rails staying well within the limits of the ATX spec. This means it's the cheapest 850W PSU to provide a stable voltage from all of its rails. However, although it was relatively efficient, it pushed out a considerable amount of hot air, and the case got rather warm during our tests. The main issue was noise, though – the fan inside the TX850W was loud and intrusive throughout our tests. Not bad value if you've a pair of earplugs.  AL



### Overall

Louder than we'd like, but it performs admirably.

**82%**

## Zalman ZM770-XT

Quiet and stable, but pricy.

Street Price \$230 Manufacturer [www.zalman.com](http://www.zalman.com)

Given the name, you won't be surprised to find that this PSU is rated at 770W.

Like the ZM660-XT, this PSU spreads its power over four 20A 12V rails, with 12V1 supplying the CPU, 12V2 one of the PCI-E cables, 12V3 the motherboard and disk drives and 12V4 the second PCI-E cable. However, the ZM770-XT's 12V rails are able to output a total of 60A, as opposed to the ZM660-XT's 53A. As with the ZM660-XT, the ZM770-XT's inner workings are cooled by a combination of copper heatsinks and heatpipes. This ensures a cool working environment and made the ZM770-XT essentially silent, even at full load.

The modular cables are wrapped in black rubber, which not only looks good but also makes them very easy to route around a case. At 180mm long, both Zalman PSUs are among the largest on test, but they should fit in most midi-tower cases.

The ZM770-XT breezed through every test the Chroma threw at it, providing 770W of stable power across the board without a hitch. It was 87 per cent efficient at 50 per cent load and 84 per cent efficient at full load. We were very impressed with both Zalman PSUs in this Labs test. Both are very quiet, provide lots of stable power and have excellent modular cables. However, while the price is high against the competition, this PSU might appeal to those with overclocked systems with more than one graphics card.  AL



### Overall

Cooler than a polar bear.

**82%**



**SATA II  
3.5" Standard  
Form Factor**

**OCZSSD2-1CLS120G**

**Read: Up to 260MB/s / Write: Up to 260MB/s**

**Sustained Write: 140MB/s**

**Max IOPS: 14,280 (4k random)**

**Buy One OCZ Colossus 120GB  
3.5" SSD and Get a *FREE*  
6-Month Subscription of**

**atomic**



OCZ Colossus 3.5" SATA Solid State Drives deliver exceptional performance for high-end desktops. Designed to offer PC enthusiasts a best-in-class storage upgrade from traditional hard disc drives, the innovative Colossus Series features incredible speed and ample storage for the complete gamut of gaming, multimedia and demanding productivity applications. The Colossus SSD series has an excellent 1.5 million hour mean time between failure (MTBF) and comes backed by a leading 3-year warranty and dedicated technical support, ensuring peace of mind over the long term.

**Terms and Conditions of OCZ Colossus 120GB Promotion:**

1. Look for specially-marked OCZ Colossus 120GB 3.5" SSDs (OCZSSD2-1CLS120G) in your favorite store or purchase from one of our selected retailers/e-tailers from now until February 28, 2010!
2. Choose from two options to activate your free 6-month subscription or free 6-month extension of your current subscription:  
OPTION 1 - Call 1300 610 765 before March 31, 2010 and mention 'OCZ Colossus Promotion.' You'll need to provide your full name, mailing address, and the serial number of your product (your serial number is printed on the small white sticker on the back of your newly purchased OCZ Colossus 120GB 3.5" SSD beginning with "SN"), along with proof-of-purchase.  
OPTION 2 - Send an email to [subs@atomicmpc.com.au](mailto:subs@atomicmpc.com.au) including 'OCZ Colossus Promotion' in the subject line and your full name, mailing address, and the serial number of your product (your serial number is printed on the small white sticker on the back of your newly purchased OCZ Colossus 120GB 3.5" SSD beginning with "SN"), along with proof of purchase.
3. Offer only available in Australia!

**OCZ**  
Technology  
OCZTECHNOLOGY.COM

**ab**

[www.abt-computers.com.au](http://www.abt-computers.com.au)

**NSW**

Mwave [www.mwave.com.au](http://www.mwave.com.au)  
TechBuy [www.techbuy.com.au](http://www.techbuy.com.au)  
AusPCMarket [www.auspcmarket.com.au](http://www.auspcmarket.com.au)  
DCA Computers [www.dcacomputers.com.au](http://www.dcacomputers.com.au)

**QLD**

Umart Online [www.umart.com.au](http://www.umart.com.au)  
Computer Alliance [www.computeralliance.com.au](http://www.computeralliance.com.au)  
PC SuperStore [www.pcsuperstore.com.au](http://www.pcsuperstore.com.au)  
ITS Direct [www.itsdirect.com.au](http://www.itsdirect.com.au)

**VIC**

Umart Online [www.umart.com.au](http://www.umart.com.au)  
Scorpion Technology [www.scortptec.com.au](http://www.scortptec.com.au)  
Solid State Central [www.solidstatecentral.com.au](http://www.solidstatecentral.com.au)  
PC Maniacs [www.pcmaniacs.com.au](http://www.pcmaniacs.com.au)

**SA**

Leader Computers [www.leadersystems.com.au](http://www.leadersystems.com.au)

**LEADER**  
COMPUTERS

**WA**

Austin Computers [www.austin.net.au](http://www.austin.net.au)  
Trinx Australia [www.trinx.com.au](http://www.trinx.com.au)

**TAS**

JTC Tasmania [Tel:03 6231 3362](tel:03 6231 3362)  
Principle Computers [www.principlecomputers.com.au](http://www.principlecomputers.com.au)

## Antec Signature 850

More than just a scribble.

Street Price \$260 Manufacturer [www.antec.com](http://www.antec.com)

Antec's PSUs have picked up numerous awards over the years, so we expected big things from the Signature 850. Its four 12V rails have a maximum combined output of 65A and are configured so that 12V1 supplies power to the motherboard and disk drives while 12V2 powers the CPU. Both rails are rated up to 22A, while 12V3 and 12V4 are rated slightly higher at 25A, each supplying two of the four PCI-E connectors. Two of the PCI-E connectors have 6+2-pins; powering two high-end graphics cards won't be an issue.

There are also nine SATA and nine Molex connections. Thankfully, the Signature 850

features modular cables, so you won't have to contend with a cable tidying job from hell. The interior of the Signature 850 is cooled by a single 80mm exhaust fan.

The Signature 850 performed flawlessly, with the voltage from its rails deviating only slightly at 100 per cent load. It also proved to be an inspiring 88 per cent efficient at 50 per cent load and 87 per cent efficient at full load. Contrary to our expectations, the Signature 850's single 80mm fan proved very quiet, no doubt thanks to the PSUs highly energy-efficient design.

Unfortunately for Antec, competition is stiff this month, and while the Signature 850's rails are rock solid and very energy-efficient, and its 80mm cooling fan is very quiet, it's too expensive. 



Overall  
Too expensive for an autograph.

83%

## Zalman ZM660-XT

Very quiet and stable, but also pricy.

Street Price \$190 Manufacturer [www.zalman.com](http://www.zalman.com)

Zalman is well-known for its quality CPU coolers, fan controllers and cases, but its PSUs are still relatively unknown. The ZM660-XT is rated at 660W with most of the power spread over four 12V rails, each of which is rated at 20A. The 12V1 rail powers the CPU, 12V2 supplies the first PCI-E cable, 12V3 powers the motherboard and disk drives and 12V4 supplies the second PCI-E cable. The PSU is able to output up to 636W across these rails, too – a significant amount of its total 660W rated power.

It also features a modular cable system, encased in flat black rubber, which looks very

neat. The only downside to this design is that the 24-pin ATX cable is very tall, which restricts airflow around the motherboard. The modular cables include one 6-pin and one 6+2-pin PCI-E, so the PSU is capable of powering a single high-end video card or a pair of mid-range ones.

The ZM660-XT passed all our tests with flying colours, and stayed well within the ATX spec. At full load it proved to be 85 per cent efficient and extremely quiet. At 50 per cent load its efficiency was an impressive 87 per cent, and it was again whisper quiet. The reason the ZM660-XT is so quiet is that, unlike other PSUs, its VRMs are cooled by a combination of copper heatsinks and heatpipes plus a 140mm fan. Nice performance, but it comes at a hefty cost. 



Overall  
Expensive for the wattage, but very reliable.

83%

## Enermax LibertyECO 620W

Like yelling into a tunnel.

Street Price \$125 Manufacturer [www.enermax.com](http://www.enermax.com)

Enermax has won plenty of awards in the past, not only because its power supplies are quiet, stable and efficient but also because they offer features such as post-shutdown cooling. The LibertyECO 620W has a lot to live up to. It gets off to a good start with modular cables that include four 6+2-pin PCI-E, eight SATA and five Molex connectors. You're unlikely to be short of power connectors. Enermax has opted for two 12V rails, each rated at up to 30A, with 48A available from both at any one time. The 12V1 rail supplies the disk drives and two of the 6+2-pin PCI-E connectors while 12V2 deals with the other two 6+2-pin PCI-E

connectors, the CPU and motherboard.

As we've come to expect from most of the Enermax PSUs we've tested, the LibertyECO 620W was rock solid, and at 50 per cent load it proved to be 86 per cent efficient. This dropped slightly to 85 per cent at 100 per cent load. The LibertyECO 620W isn't noisy, but it could be quieter. Considering the price comes in at only a shade over \$125, this is almost forgivable.

As with most of the PSUs in this Labs test, there's nothing inherently wrong with the LibertyECO 620W. However, it loses out on the noise front and lacks post-shutdown cooling, which you'll find in most Enermax PSUs. As such there are better-value mid-range PSUs to be had. 



Overall  
Noisy fan, but the rails are quite stable.

84%

# HOT GAMES! HOT PRICE!

## OCZ ModXStream Pro 500W

Extremely nice power.

Street Price \$135 Manufacturer [www.ocztechnology.com](http://www.ocztechnology.com)

The OCZ ModXStream Pro 500W is not one of the cheapest PSUs in this Labs test, retailing for \$135 when we went to press. We were keen to see if it was cheap and nasty or actually offered good value for money compared with the more expensive PSUs.

Impressively for a mid-range PSU, the ModXStream Pro 500W has modular cables. If you need to connect only one or two peripherals, the inside of your PC won't be littered with unused cables. Unlike the OCZ Fatal1ty 700W, the ModXStream Pro 500W has two 12V rails rated at up to 18A each, with a maximum combined output of 36A. This means that 432W of its total 500W rated power can be sent over the 12V rails at any one time. We were also pleased by the ModXStream Pro 500W's performance – each of its rails output a stable voltage.

What's more, it proved to be very quiet at 50 per cent load, thanks to its large 140mm fan, although it gets slightly louder at full load. The ModXStream Pro 500W is also pretty efficient, averaging 85 per cent. Although the ModXStream Pro 500W doesn't have



many cables, this shouldn't be a problem given its comparatively low 500W power rating. As such, if you're building a PC to a relatively decent budget but still want a cool, efficient power supply, you should buy the ModXStream Pro 500W. **AL**



## Antec TruePower New TP-750

Great value, though loud.

Street Price \$190 Manufacturer [www.antec.com](http://www.antec.com)

Unlike the Signature 850, the TruePower New TP-750 is available for the slightly more agreeable price of \$190. The TruePower New TP-750 has 100W less power available than the Signature 850, as it's rated at 750W. It's cooled differently, too, with a 120mm fan rather than an 80mm fan. However, the rest of its specification is very similar. It has four 12V rails, with 12V1 supplying the motherboard and disk drives, 12V2 supplying the CPU and 12V3 and 12V4 sharing responsibility for the four PCI-E connectors.

As with the Signature 850, 12V1 and 12V2 are rated at up to 22A each, while 12V3 and 12V4 are slightly beefier at 25A each. The PSU provides 744W of power on tap over the 12V rails and it also has an identical modular cable layout to the Signature 850 with nine SATA, nine Molex and four PCI-E cables, two of which are 6+2-pin. The TruePower New TP-750 performed admirably when it went head to head with the Chroma's barrage of tests, and there was no hint of failure.

It also proved capable of outputting its power efficiently, recording an efficiency of 88



per cent at 50 per cent load and 86 per cent at full load. Its 120mm fan was clearly audible, but the audible tone is a hum rather than a whine, so it isn't too annoying. Considering that the TruePower New TP-750 is stable, comes with plenty of cables and is very efficient, it's a great choice. **AL**



## Seasonic M12D850W

Only lacking in noise.

Street Price \$270 Manufacturer [www.seasonic.com](http://www.seasonic.com)

Seasonic is one of the largest PSU manufacturers in the world, selling PSUs under its own name and acting as an OEM for many other brands, such as Corsair. Although we first heard of the M12D 850W a couple of months ago we thought it worth a look. The M12D 850W has modular cables, which in this case are a godsend, as we certainly wouldn't fancy tidying up its four 6+2-pin PCI-E, eight S-ATA and eight Molex connectors. The 12V supply is split over two 40A rails, with a maximum combined output of 70A. The 12V1 rail powers the motherboard, 4-pin ATX12V, two of the

PCI-E cables and two of the modular disk drive sockets, while 12V2 powers the 8-pin EPS12V, the remaining two PCI-E cables and two final modular disk drive sockets.

As we've come to expect from Seasonic PSUs, the M12D 850W proved to be solid as a rock throughout the tests and was also blissfully quiet. Efficiency was another strong point – it was 87 per cent efficient at 50 per cent load and 86 per cent efficient at full load. There are many 800W+ PSUs on the market, but the M12D 850W is leaps and bounds ahead of the rest. With the FSP Everest 85PLUS 800W failing several tests and this Seasonic retailing only \$10 more than the Antec Signature 850, the M12D 850W is the best PSU in its class.  AL



Overall  
The best 850W PSU you can buy.

85%

## Enermax Revolution85+ 1050W

Viva la PSU!

Street Price \$300 Manufacturer [www.enermax.com](http://www.enermax.com)

The 1kW Enermax Galaxy graced the high-powered computing list for several years, but eventually lost its crown to the Corsair HX1000W. Now, Enermax is finally back with a new series of high-end PSUs.

This model is midway up the Revolution range and is rated to deliver up to 1.05kW of power. Most of this is generated by six 12V rails, each rated at up to 30A, with a maximum combined output of 87A. The 12V1 rail powers the motherboard, half of CPU1 and CPU2; 12V2 powers the other half of CPU1 and CPU2; 12V3 powers the two captive PCI-E cables; 12V4 powers three of the modular

disk drive sockets; 12V5 supplies the middle two modular PCI-E cables while 12V6 powers the remaining modular disk drive sockets and the rest of the modular PCI-E cables.

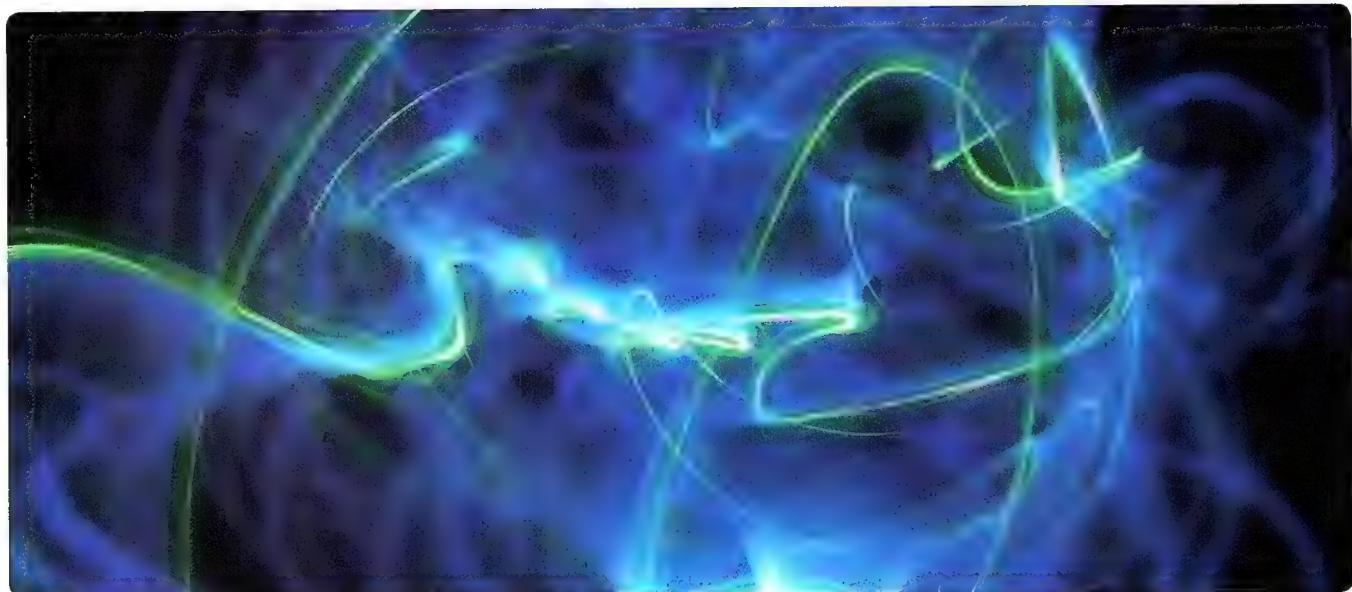
Like the Galaxy, the Revolution has a silly number of connectors: eight 6+2-pin PCI-E, two 8-pin EPS12V, 16 S-ATA and six Molex. Unlike the Galaxy, which was cooled by two relatively quiet fans, the Revolution is kept ice cool by a single very quiet 135mm intake fan. This also provides post-shutdown cooling.

The Revolution is 100 per cent stable and very efficient – measuring 89 per cent at both 50 per cent and full load. Despite its high price, if you want the very best PSU you should buy one of these, and join the Revolution.  JG



Overall  
The very best the PSU industry has on offer.

92%



## Power Supply Feature tables

	Antec Signature 850	Antec TruePower New TP-750	Arctic Cooling Fusion 550R	Cooler Master Real Power M1000	Cooler Master Silent Pro M600
<b>Price</b>	\$260.00	\$190.00	\$95.00	\$320.00	\$145.00
<b>Features</b>					
<b>Fans</b>	80mm	120mm	80mm	135mm	135mm
<b>Dimensions (mm) (W x D x H)</b>	150 x 180 x 86	150 x 150 x 86	150 x 160 x 86	150 x 180 x 86	150 x 150 x 86
<b>Claimed output</b>					
<b>12V each rail (combined)</b>	22A, 22A, 25A, 25A (max 65A)	22A, 22A, 25A, 25A (max 62A)	17A, 17A (max 34A)	18A, 18A, 28A, 28A, 18A, 18A (max 80A)	40A
<b>Maximum combined output</b>	850W	750W	550W	1kW	600W
<b>Connections</b>					
<b>Molex</b>	9	9	3	10	5
<b>S-ATA</b>	9	9	6	8	9
<b>PCI-E</b>	2 x 6+2-pin, 2 x 6-pin	2 x 6+2-pin, 2 x 6-pin	2 x 6+2-pin	2 x 8-pin, 2 x 6-pin	2 x 6+2-pin
<b>8-pin EPS12V</b>	1	1	N	1	1

	Corsair CX400W	Corsair TX850W	Enermax Liberty ECO 620W	Enermax Revolution 85+ 1,050W	FSP Epsilon 85PLUS 600W
<b>Price</b>	\$85.00	\$230.00	\$125.00	\$300.00	\$169.00
<b>Features</b>					
<b>Fans</b>	120mm	140mm	120mm	135mm	120mm
<b>Dimensions (mm) (W x D x H)</b>	150 x 140 x 86		150 x 140 x 86	150 x 180 x 86	150 x 140 x 86
<b>Claimed output</b>					
<b>12V each rail (combined)</b>	30A	70A	30A, 30A (max 48A)	30A, 30A, 30A, 30A, 30A, 30A (max 87A)	18A, 18A, 18A, 18A (max 46A)
<b>Maximum combined output</b>	400W	850W	620W	1.05kW	600W
<b>Connections</b>					
<b>Molex</b>	6	8	5	6	5
<b>S-ATA</b>	6	8	8	16	6
<b>PCI-E</b>	1 x 6+2-pin	4 x 6+2-pin	4 x 6+2-pin	8 x 6+2-pin	1 x 6+2-pin, 1 x 6-pin
<b>8-pin EPS12V</b>	1	1	1	2	1

	FSP Everest 85PLUS 800W	OCZ Fatalty 700W	OCZ ModXStream Pro 500W	Seasonic M12D 850W	Zalman ZM660-XT	Zalman ZM770-XT
<b>Price</b>	\$315.00	\$165.00	\$135.00	\$270.00	\$190.00	\$220.00
<b>Features</b>						
<b>Fans</b>	120mm	120mm	140mm	120mm	140mm	140mm
<b>Dimensions (mm) (W x D x H)</b>	150 x 165 x 86	150 x 160 x 86	150 x 160 x 86	150 x 160 x 86	150 x 180 x 86	150 x 180 x 86
<b>Claimed output</b>						
<b>12V each rail (combined)</b>	20A, 20A, 20A, 20A (max 64.4A)	56A	18A, 18A (max 36A)	40A, 40A (max 70A)	20A, 20A, 20A, 20A (max 53A)	20A, 20A, 20A, 20A (max 60A)
<b>Maximum combined output</b>	800W	700W	500W	850W	660W	660W
<b>Connections</b>						
<b>Molex</b>	8	8	4	8	6	6
<b>S-ATA</b>	9	8	6	8	12	12
<b>PCI-E</b>	4 x 6+2-pin	2 x 6+2-pin	1 x 6+2-pin, 1 x 6-pin	4 x 6+2-pin	1 x 6+2-pin, 1 x 6-pin	1 x 6+2-pin, 1 x 6-pin
<b>8-pin EPS12V</b>	1	1	1	1	1	1

## ALL NEEDS COMPUTERS

[www.allneeds.com.au](http://www.allneeds.com.au)

08 8211 8661

## AUSTIN COMPUTERS

[www.austin.net.au](http://www.austin.net.au)

08 9201 2788

## CENTRE COM

[www.centrecom.com.au](http://www.centrecom.com.au)

## COMPUTER ALLIANCE

[www.computeralliance.com.au](http://www.computeralliance.com.au)

07 3421 3200

## COMPUTER & PARTS LAND

[www.cpl.net.au](http://www.cpl.net.au)

03 8542 8688

## D'AMBRA COMPUTERS

[www.dambracomputers.com.au](http://www.dambracomputers.com.au)

08 8252 6223

## JK

[www.jk.com.au](http://www.jk.com.au)

02 8745 0877

## LEADER COMPUTERS

[www.leadersystems.com.au](http://www.leadersystems.com.au)

06 8112 6000

## MWAVE

[www.mwave.com.au](http://www.mwave.com.au)

## NET PLUS

[www.netplus.com.au](http://www.netplus.com.au)

08 8242 7288

## PC SHOPPER

[www.pcshopper.com.au](http://www.pcshopper.com.au)

07 3397 0777

## PLECOMPUTERS

[www.ple.com.au](http://www.ple.com.au)

03 8203 4444

## PRINCIPAL COMPUTERS

[www.tasmaplade.com.au](http://www.tasmaplade.com.au)

03 5295 8111

## SCORPION TECHNOLOGY

[www.scorpiec.com.au](http://www.scorpiec.com.au)

1300 726 770

## TECHBUY

[www.techbuy.com.au](http://www.techbuy.com.au)

02 8648 1818

## UMART

[www.umart.com.au](http://www.umart.com.au)

07 3369 3928

## XP MICRO

[www.xpmicro.com.au](http://www.xpmicro.com.au)

08 8112 6000



**Element**  
**case series**

 **Thermaltake**  
COOL ALL YOUR LIFE

[WWW.THERMALTAKE.COM.AU](http://WWW.THERMALTAKE.COM.AU)



## Daniel Rutter knows what he likes in an ad.

I think I'll miss those special advertisements, that only ever appear in computer magazines, when they finally die out completely.

You know the ones I mean.

The type of specimen is an ad for a motherboard or graphics card. It may or may not include a tastefully small picture of the actual product. Much more important is the background image, which absolutely must feature a 3D-rendered spaceship, racing car, fantasy monster or revealingly-clad chick. If possible, the chick should be equipped with wings, or weapons, or both. Ideally, more than one of these items should be depicted, even if it pushes the actual product right down into the fold of the magazine next to a staple.

## Normal Western-world advertisements for the products of large companies usually have very nearly zero real information content...

This magnificent promotional concoction invariably takes up an entire page of the magazine, and it is lightly garnished with some copy which *must* – this part really isn't negotiable at all – be written by a person with a poor grasp of English.

I'm not sure whether equivalent ads in Hong Kong computer magazines feature Cantonese copy written by someone specially imported from Alice Springs. Further research is clearly called for.

Now, don't get me wrong – these ads are there to do a job, and they do it well. I honestly do not know what I would have done with myself if I had not recently been informed that there's a Cooler Master case that provides "Swift Intelligence" and "Secure Mobilization", and a Thermaltake case whose glowing fans "create a strong, dynamic and exciting atmosphere to stimulate gamers with an ambience that can be

in tune with their respective gameplay".

And I assure you that my future RAM purchases will be strongly influenced by the ad-assisted discovery that G.Skill memory is "sharp, fierce, powerful". I was actually looking more for something "avuncular, cajoling, vine-ripened", but I find myself persuaded.

When I first saw these sorts of ads – more than ten years ago, now, which is an eternity in the computer-components business – I presumed they'd soon be displaced by more tediously effective ones. Normal Western-world advertisements for the products of large companies usually have very nearly zero real information content, but whatever tiny message they do manage to convey usually isn't "We

one that has a chick with a gun and a giant shiny robot, apparently about to clobber the chick with an HD 4890 the size of Taronga Zoo.

One day, though, bland professionalism, tedious utility and those enemies of humanity who call themselves 'creatives' will finally kill the crazy ads.

I hope they go out in a blaze of glory.

Someone should make a motherboard ad dominated by a space battle more complicated than the start of *Revenge of the Sith*, with DayGlo arrows pointing out truly unusual motherboard features. "Scratch-'n'-Sniff x16 Slot!", "Heat pipe NOT tested on pangolins!", "8-Layer PCB stops up to .30-30 Winchester!"

I solemnly promise to buy that motherboard. But only if it comes with a poster of the ad. 

Dan has only been abducted a few times...  
[dan@atomicmpc.com.au](mailto:dan@atomicmpc.com.au)

couldn't be bothered proofreading this!".

(That, I think you'll agree, may not exactly be the *optimal* message to send to your customers, when you're in the business of selling things that contain millions of transistors and thousands of lines of code, all of which must work perfectly if the product is to avoid making its user want to die.)

But no – there the demented things still are. I bet there's one or two of 'em in the very copy of Atomic you now hold in your hands.

That's not nearly as many as there used to be, though. When it were all trees 'round 'ere, lad, you could count on a hatful of those ads inside any computer magazine, and a bonus silver dragon or fairy-with-two-pistols on the back cover.

Credit where it's due, though; local distributor Altech has recently put some excellent examples of this breed of ad on Atomic's back cover. I was particularly pleased by the ATI-graphics-card

# KITLOG

These are our four basic systems, with something for every taste. On this page, the **Basic Game Box** is put together with money-saving in mind, but also an eye to getting as much bang for buck. It's the best value system for those who want a lot of processing grunt, but who don't want to sacrifice the upgradeability or compatibility that is so important. Intel's going to keep the P55 socket around for quite some time, so making the leap to this new platform is well-timed.

A decent case is the backbone of any great rig, and this case is definitely great. It's got more than enough room for everything you'd want (ever), looks sextacular and comes with plenty of cooling straight out of the box. We like.

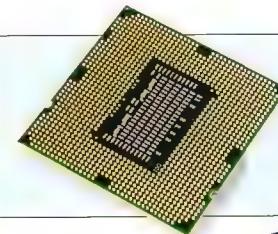


**The Perfect PC**, on the other hand, is the system everyone aspires to, with nothing but the best parts – without going crazy, though. It's a collection of all the greatest hardware that we'd pick without a budget, sure to impress with performance and sheer style.

Oh, and if you're wondering what the Ref IDs are, that's the ID of that article on our website. Just enter it like this – [www.atomicmpc.com.au/?NUMBER](http://www.atomicmpc.com.au/?NUMBER) – and you'll go straight to that review.

## BASIC GAME BOX

CPU



**Intel Core i5 750**  
PRICE \$240

Intel's budget quad is more than you'll need in a chip!  
*Issue 106, Page 36*

MOTHERBOARD



**GIGABYTE P55-UD4**  
PRICE \$225

A great value P55 board with some nice features..  
*Issue 106, Page 39*

MEMORY



**G.Skill Ripjaws 2000MHz**  
PRICE \$170

Great value memory with amazing overclocking.  
*Issue 106, Page 52*

VIDEO CARD



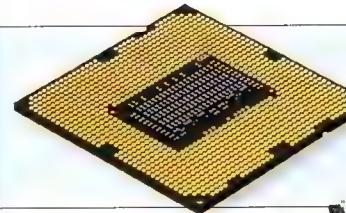
**XFX 5770**  
PRICE \$218

A decent value way to get into DX11.  
*Issue 107, Page 47*



## THE PERFECT PC

CPU



**Intel Core i7 870**  
PRICE \$690

The best enthusiast chip, ever.  
*Issue 105, Page 34*

MOTHERBOARD



**ASUS P7P55D Deluxe**  
PRICE \$296

Increase your performance, sex appeal and social standing!  
*Issue 105, Page 41*

MEMORY



**Corsair Dominator TR3X6G1866C7GTF**  
PRICE \$388

Plenty of memory, blisteringly fast and darn sexy.  
*Ref ID: 149838*

VIDEO CARD



**ATI 5970**  
PRICE \$850

A dual-cored DX11 beast, the most powerful yet.  
*Issue 108, Page 34*

For more builds check out the Kitlog E-mag at [atomicmpc.com.au/kitlog](http://atomicmpc.com.au/kitlog)

**SUBTOTAL: \$1743**



**Aywun ATV8**

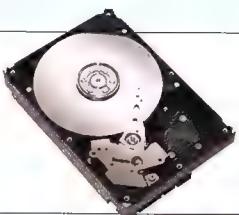
PRICE \$52

Performs well, incredible value, bloody awesome.  
*Issue 103, Page 47*

**1TB HDD**

PRICE \$90

A thousand gigabyte storage drive on the cheap.



**Viewsonic VX2233WM**

PRICE \$199

21.5 inches of value-packed screen, great buy.  
*Issue 108, Page 42*

**Plantronics Gamecom 777**

PRICE \$94

Solid set of cans with great audio.  
*Issue 101, Page 41*



**Onboard Realtek ALC889A**

A decent chip that does the job.

**OCZ Agility 120GB**

PRICE \$555

Lightning-fast Indilinx controller speed for your OS and games.  
*Ref ID: 158083*



**Dell 2408WFP**

PRICE \$899

A huge 24in LCD screen for your prettiest pixels.  
*Issue 103, Page 57*

**Logitech Z-5500D**

PRICE \$425

Earth-shakingly good.  
*Issue 48, Page 56*



**Auzentech X-Fi Prelude**

PRICE \$279

Best soundcard ever!  
*Ref ID: 112419*

**CASE**



**Lancool Dragonlord PC-K62**

PRICE \$165

Vibration damped, great cooling and sexy looks.  
*Issue 105, Page 49*



**KEYBOARD**

**Razer Arctosa**

PRICE \$50

A cool-looking keyboard that'll serve you very well.  
*Ref ID: 149483*

**MOUSE**



**Verbatim Rapier V1**

PRICE \$65

Great gaming performance and nifty features.  
*Issue 96, Page 43*

**POWER SUPPLY**

**Corsair TX-750**

PRICE \$175

Quiet performance, great noise and plenty of cables.  
*Ref ID: 107260*



**SUBTOTAL: \$5292**

**CASE**



**Coolermaster ATCS 840**

PRICE \$370

Heaps of fans, plenty of space, and dripping with quality.  
*Ref ID: 132479*



**KEYBOARD**

**Microsoft Sidewinder X6**

PRICE \$80

Backlit, sturdy, magnetic numpad & macro keys; what's not to like?  
*Ref ID: 129535*

**MOUSE**



**Microsoft Sidewinder X8 Wireless**

PRICE \$105

Cable-less, comfortable, lag-free and fraggable!  
*Ref ID: 148422*

**POWER SUPPLY**

**XFX 850W**

PRICE \$270

Plenty of power, ultra-stable rails and a great price.  
*Issue 107, Page 50*

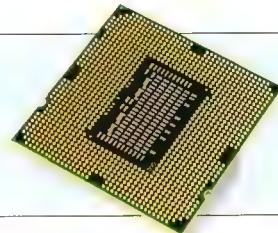


The **LAN Box**, the ultimate in portable gaming power – go anywhere, frag anyone. No longer will you be tied to a desk or forced to awkwardly manhandle your full-sized rig, helped by a convenient handle and beefy tech. Perfect for wowing people at LANs, the tech inside is fast enough to run any game, and boasts enough speed to keep your game running at full clip even if other programs intrude in the background. After all, no-one wants to miss a headshot.

As much as the previous case is important, no HTPC can be without an appropriate box either. This one is inoffensive on the eye, but it'll slot in just perfectly with any other home theatre gear you've got and do so without making any offensive noises. Sure it doesn't have an LCD screen, but that's a feature that you'll pay hundreds more for, and this truly is one of the best value HTPC cases out there.

Finally, for the more entertainment-minded – and really, that's all of us – there's our **Home Theatre PC**, ready to play movies and music quietly and efficiently. It's got plenty of speed for video encoding while you're away, but makes very little noise thanks to the passive components used – even the heatsink can be dialed down to emit as much or as little noise as you want. Perfect for leaving next to the big-screen TV for all your media needs.

## THE LAN BOX



### Intel Core i5 750

PRICE \$240

Intel's budget quad is more than you'll need in a chip!  
*Issue 106, Page 36*



### GIGABYTE P55M-UD4

PRICE \$195

Great overclockability, nice value.  
*Issue 107, Page 40*



### G.Skill Ripjaws 2000MHz

PRICE \$170

Great value memory with amazing overclocking.  
*Issue 106, Page 52*

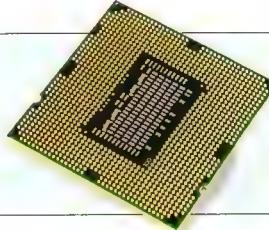


### XFX 5770

PRICE \$218

A decent value way to get into DX11.  
*Issue 107, Page 47*

## THE HTPC



### Intel Core i5 750

PRICE \$240

Plenty of power for HTPC duties, video encoding champ.  
*Issue 106, Page 36*



### GIGABYTE P55M-UD4

PRICE \$195

mATX form factor doesn't skimp on storage, or speed.  
*Issue 107, Page 40*



### G.Skill Ripjaws 2000MHz

PRICE \$170

4GB of fast memory is plenty for running multiple HTPC media streaming apps.  
*Issue 106, Page 52*



### Zotac 9400GT Zone

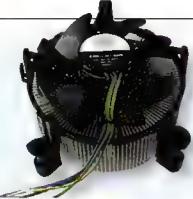
PRICE \$105

Silent as the grave, and HD playback is perfect.  
*Ref ID: 137603*

For more builds check out the Kitlog E-mag at [atomicmpc.com.au/kitlog](http://atomicmpc.com.au/kitlog)

**SUBTOTAL: \$1656**

COOLER



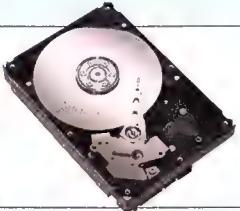
**Intel Stock Cooler**  
PRICE FREE

Does the job, fits under PSU well.

SYSTEM DRIVE

**1TB HDD**  
PRICE \$90

A thousand gigabyte storage drive on the cheap.



DISPLAY



**Viewsonic VX2233WM**  
PRICE \$199

21.5 inches of value-packed screen, great buy.  
*Issue 108, Page 42*

AUDIO

**Plantronics Gamecom 777**  
PRICE \$94

Solid set of cans with great audio.  
*Issue 101, Page 41*



**Onboard Realtek ALC889A**  
PRICE \$50

A decent chip that does the job.

CASE



**Silverstone SG04**

PRICE \$195

Small case with handle; add two 120mm fans for awesome cooling.  
*Ref ID: 148266*

KEYBOARD



**Razer Arctosa**  
PRICE \$50

A cool-looking keyboard that'll serve you very well.  
*Ref ID: 149483*

MOUSE



**Verbatim Rapier V1**

PRICE \$65

Great gaming performance and nifty features.  
*Issue 96, Page 43*

POWER SUPPLY



**Corsair HX-520**  
PRICE \$140

Modular, efficient and keeps size manageable in cramped case.

**SUBTOTAL: \$2406**

COOLER



**Scythe Big Shuriken**  
PRICE \$79

Tiny 58mm height, quieter than a sponge.

CASE



**SilverStone Grandia GD04**

PRICE \$155

Stylish exterior, 3x120mm filtered fans, 2x3.5" HDD space with plenty of room.  
*Issue 108, Page 47*

SYSTEM DRIVE

**Seagate Barracuda 1.5T**  
PRICE \$145

Fast, voluminous storage for all your pr0n, videos and music.  
*Ref ID: 141622*



**Logitech diNovo Edge**  
PRICE \$199

Wireless board with a trackpad for mousing.



OPTICAL



**LG GGC-H20L**  
PRICE \$175

Bluray and HDDVD playback – best of both worlds

KEYBOARD



AUDIO

**Razer Mako 2.1 Speakers**  
PRICE \$469

Stylish tub-thumpers.  
*Ref ID: 126695*



**ASUS Xonar HDAV 1.3**

PRICE \$279

Nice sound, expansion good.  
*Ref ID: 135112*



POWER SUPPLY



**Corsair HX-520**

PRICE \$140

Modular and above all quiet for this whisper-soft build.

# SUBSCRIBE



3 X  
INTEL® CORE™ i7 - 860  
PROCESSOR  
TO BE WON

**\$459 EACH**

Runs  
great on



5 X NAPOLEON:  
TOTAL WAR  
STANDARD EDITION  
TO BE WON

Games  
for Windows

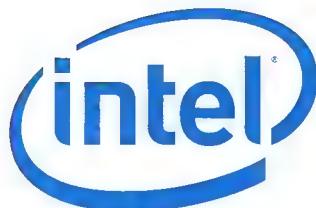


**\$69.95 EACH**



**\$99.95 EACH**

5 X NAPOLEON: TOTAL WAR  
EMPEROR'S EDITION  
TO BE WON



NAPOLEON  
TOTAL WAR™

# Subscribe online at [www.subscribenow.com.au/ato/1083](http://www.subscribenow.com.au/ato/1083)

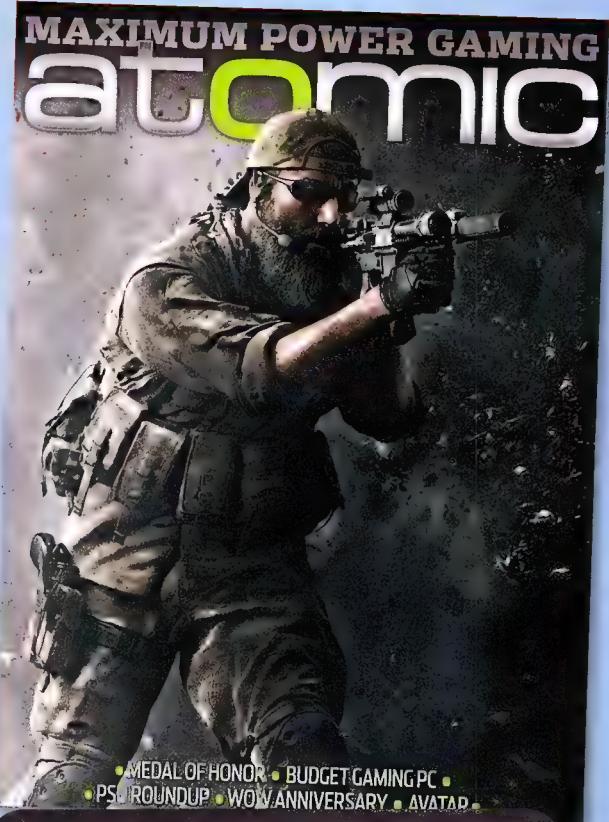
Offer only available to Australian subscribers until 9/2/2010. Competition open to Australian residents only. Authorised under NSW Permit Number: LTPM/09/00453 and ACT TP 09/02482.

# AND WIN!

Reading *Atomic* can provide much joy, but only subscribing can win you an Intel i7 CPU or a copy of the great new game Napoleon: Total War! Thanks to Sega, three people will each win an Intel i7-860, five first runners up will each win a copy of Napoleon: Total War Emperors Edition, while five second runners up will win a copy of Napoleon: Total War Standard Edition. No hidden catches or hoops – just subscribe!

## WHY SUBSCRIBE?

- 1 WIN AN INTEL I7-860 OR A COPY OF NAPOLEON: TOTAL WAR
- 2 SPECIAL SUBSCRIBER-ONLY COVERS!
- 3 DELIVERED TO YOUR DOOR, OR MAILBOX, OR SECRET HIDEAWAY
- 4 FULL MONEY BACK GUARANTEE
- 5 THE GREATEST TECH MAG IN THE GALAXY!



## EXCLUSIVE COVER!

## SUBSCRIPTION PRICES

3 MONTHS - \$17.95 every three months

6 MONTHS - \$34.95 every six months

1 YEAR (12 issues) - \$69.95 - single payment

2 YEAR (24 issues) - \$128 single payment

For NZ and overseas subscription prices, subscribe online or call +61 2 8296 5495

© SEGA. The Creative Assembly, Total War, Napoleon: Total War and the Total War logo are trademarks or registered trademarks of The Creative Assembly Limited. SEGA and the SEGA logo are registered trademarks or trademarks of SEGA Corporation. All rights reserved.

Intel, the Intel logo, Intel Core, and Core Inside are trademarks of Intel Corporation in the U.S. and other countries.

or call 1300 610 765

For overseas prices and terms and conditions, visit [www.atomicmpc.com.au/subscribe](http://www.atomicmpc.com.au/subscribe) or call +61 2 8296 5495. Quote '1083' when ordering subscription.

# Do you like building systems?

## KITLOG

Issue 2, January 2010

atomic

The essential guide to  
overclocking the greatest  
PC hardware.

Are you keen to always  
know the best hardware  
for any PC build or rig?  
Then you need to check  
out our new Kitlog  
eBook, a quarterly online  
publication dedicated  
to showing you the best  
gear for more than a  
half-dozen projects.



Only available at [www.atomicmpc.com.au/kitlog](http://www.atomicmpc.com.au/kitlog)

# TUTORIAL

HANDS-ON TUTORIALS FOR THE TECHNICALLY MINDED

This month it's education, and nothing but education.

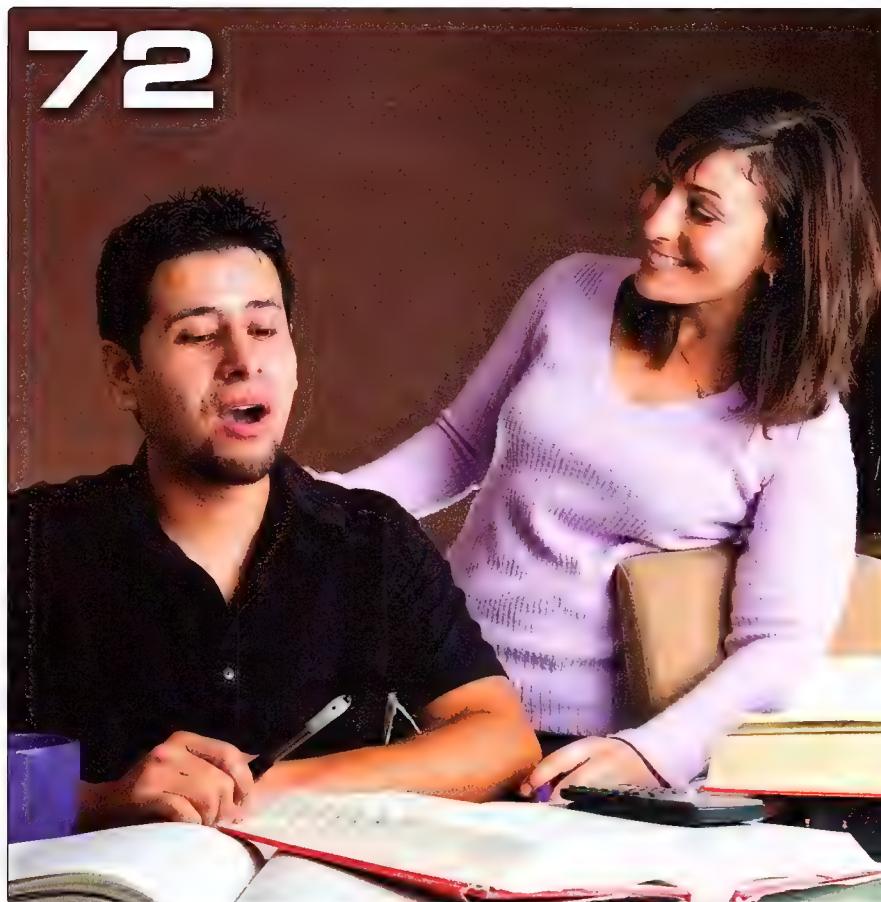
Christopher Taylor joins us for a solemn and highly educational piece on the benefits of choosing a TAFE education over university. I mean, really - who needs university, with all its intimations of collegiate boys' clubs and over-priced bars, and people who've been their longer than you and look down on you for being a first year?

But we're not bitter. Oh no.

Um...

...

Look over there! \*runs\*



**TUTORIAL CONTENTS**

**Atomic.edu** 72

How to get the knowledge and insider gossip you need for getting into the game development industry.

**KITLOG**

Issue 2, January 2003

**Do you like building systems?**

Are you keen to always know the best hardware for any PC build or rig? Then you need to check out our new KitLog eBook, a quarterly online publication dedicated to showing you the best gear for more than a half-dozen PC projects.

Only available at [www.atomicmpc.com.au/kitlog](http://www.atomicmpc.com.au/kitlog)

**Huntkey®**  
Power Your Dream

Powerhousepc Australia Pty Ltd  
E-mail: [business@powerhousepc.com.au](mailto:business@powerhousepc.com.au)  
Tel: 612-96486268 Fax: 612-96486269  
Website: [www.powerhousepc.com.au](http://www.powerhousepc.com.au)

Huntkey Hong Kong Development Co., Ltd.  
Address: Huntkey Industrial Park, Bantue Road, Bantian, Shenzhen, 518129, China  
Tel: +86-755-89606666 Fax: +86-755-89606699  
Email: [markets@huntkey.com](mailto:markets@huntkey.com)  
Website: [www.huntkeydiy.com](http://www.huntkeydiy.com)



**X7 900W**

- Complies with Intel ATX12V V2.3 & EPS12V V2.92
- Cable management design
- Advanced phase-shifting control full-bridge brings high reliability & efficiency



**H403**

- Mesh Design for the Front Panel
- E-SATA Ports Supported
- Water-cooled Radiator Supported
- 12cm LED Fan of Low Noise
- Screw-free Installation



**PAA804 Power Strip**

- Full 3-lines surge protection to ensure maximum safety
- User-friendly design



# TAFE



**The dude with the edumactioal smarts talks up an alternative to University.**

We could fairly be accused of giving far more attention to university than we do to TAFE. And to be sure, to maximise your chances of attaining some positions in the very broad field that is information, a Bachelor or higher-level degree is important. That is not to say the TAFE system is rubbish. Far from it; TAFE is worthwhile considering for a number of reasons, from both the perspective of a school leaver and a member of the workforce looking to change careers or develop their skill set.

## Some points

TAFE offers a very large selection of courses at Certificate, Diploma, Advanced Diploma and Bachelor levels. That TAFE courses can offer Bachelor-level qualifications may come as a surprise to some readers: it is a recent initiative and, at this point, only ten TAFE institutes nationwide offer such qualifications.

TAFE qualifications range from short courses that run in the evenings for a couple of months to programmes that run for three years full-time. In comparison, most undergraduate degrees are a minimum of three years long full-time.

Industry standard qualifications such as A+, CCNA, CCNP and MCSE are also delivered through TAFE campuses. Keep in mind that many TAFE and university-level programmes may offer these qualifications – particularly the Cisco ones – as elective or core subjects.

Generally, TAFE programmes are more hands-on than university programmes: there is naturally a theory component, but plenty of opportunities to put new knowledge into practice. TAFE teachers have to have experience in their field.

year twelve-level mathematics or science classes to a specific standard is unheard of. The study load at TAFE generally isn't as high. The demand for any one course at any one institute generally isn't too bad, either; numerous institutes can and do provide exactly the same course using, usually, exactly the same material. There is no competition between institutes in the same way there is competition between universities, as they are all government-owned. Entry into some courses depends more on your performance in an interview or portfolio presentation than any past qualifications you may or may not have completed respectfully, including year twelve.

As well as being shorter, more practical and more accessible than university courses, TAFE courses are usually much cheaper. If you're on a low income – and, if you're a full-time student living out of home, you probably are – concessions are available. I completed my Diploma as a concession student and paid very little for it. The TAFE system is designed to be very accessible.

As well as providing qualifications useful and respectable in their own right, TAFE can serve as a taster for, or a pathway into, university. If you're unsure about your level of commitment to a particular field, attempting a TAFE course is a far cheaper and less time-consuming exercise than signing up for an undergraduate degree and HECS-HELP debt. If you failed to make the cut for a particular university course, completing a TAFE programme in a similar field can qualify you for entry into the Bachelor degree and give you grounds for recognition of prior learning.

For instance, say you wanted to enter a Bachelor of Games Programming after year



experience you may have and shave time off your course.

Finally, if you are interested in pursuing a university level course but don't qualify due to your lack of an appropriate background in mathematics, science or computing, you may be able to find TAFE courses that will cover those areas to a suitable level. Speak to your university as well as your local TAFE for more specific information. TAFE, of course, also offers year twelve certificates in the event you have not completed your final year of secondary schooling or would like a second attempt at it.

TAFE isn't just accessible in the academic sense of the word. There are TAFE institutes in every state and territory. In terms of location, TAFE can be much more convenient for some Australians than university. TAFE institutes operate not only in major cities and their suburbs, but rural centres such as Ballarat and Mount Isa too. Note that in this article, we are only going to talk about TAFE institutes that provide information technology courses. Understand that TAFE institutes often have multiple campuses and are generally organised in terms of geography. Illawarra Institute in New South Wales, for instance, has 14 campuses spread across the Illawarra, South Coast and Southern Highlands regions. Most courses will be offered at a few campuses – again, accessibility is an important part of the TAFE model – but no one campus will offer everything in the Institute's repertoire. Poking around the websites of specific institutes will let you know what is available where. Also, the amount of information technology courses offered at the institutes listed below varies considerably. Riverina Institute, for instance, offers a fairly small range.

## Australian Capital Territory

ACT is home to one TAFE institute, the Canberra Institute of Technology ([www.cit.act.edu.au](http://www.cit.act.edu.au)). It has six campuses located across Canberra. The courses on offer range from a Bachelor of Games and Virtual Worlds to an Advanced Diploma of

## Poking around the websites of specific institutes will let you know what is available where.

Of course, the amount of experience individual staff members have can vary considerably. A few years ago I completed a Diploma in a field unrelated to information technology and encountered staff who were reasonably successful in their chosen art and were teaching part-time, but also staff who had less experience than some of their students. In fields where the chances of finding a full-time job that pays enough to cover rent, food and bills are reasonable, you're less likely to find this sort of teacher. But do keep it in mind any sort of institute – TAFE, university, private outfit – tries to sell you a course based on the amount of experienced teaching staff.

TAFE courses are easier to get into than university courses. Having had to complete specific

twelve but didn't make the grade. Knocking over a Diploma of Games Development should prove to the university you are capable of understanding the material and keeping up with the demands of tertiary-level study. Therefore, you're worthy of admission into their illustrious Bachelor programme. Not only that, but they could shave anything from a couple of subjects to a full eighteen months off your Bachelor, seeing as you have already covered the fundamentals in your Diploma.

Recognition of prior learning isn't just something for those looking to finish TAFE and move on to university-level study. When you enrol in a TAFE course, the institute can assess any qualifications, workplace training or on-the-job

Computer Forensics. Information on how to apply to CIT can be found on the website.

## New South Wales

For detailed information on applying for a TAFE course in NSW, point your browser in the direction of this page (<https://www.tafensw.edu.au/applyenrol/applying/index.htm>). NSW is home to Hunter Institute ([www.hunter.tafensw.edu.au](http://www.hunter.tafensw.edu.au)), Illawarra Institute ([www.illawarra.tafensw.edu.au](http://www.illawarra.tafensw.edu.au)), New England Institute ([www.newengland.tafensw.edu.au](http://www.newengland.tafensw.edu.au)), North Coast Institute ([www.nci.tafensw.edu.au](http://www.nci.tafensw.edu.au)), Northern Sydney Institute ([www.nsi.tafensw.edu.au](http://www.nsi.tafensw.edu.au)), Riverina Institute ([www.rit.tafensw.edu.au](http://www.rit.tafensw.edu.au)), South Western Sydney Institute ([www.swws.tafensw.edu.au](http://www.swws.tafensw.edu.au)), Sydney Institute ([www.sit.nsw.edu.au](http://www.sit.nsw.edu.au)), Western Institute ([www.wit.tafensw.edu.au](http://www.wit.tafensw.edu.au)) and Western Sydney Institute ([www.wsi.tafensw.edu.au](http://www.wsi.tafensw.edu.au)).

## Northern Territory

Charles Darwin University ([www.cdu.edu.au](http://www.cdu.edu.au)) offers some TAFE-level qualifications.

## Queensland

Barrier Reef Institute of TAFE ([www.barrierreef.tafe.qld.gov.au](http://www.barrierreef.tafe.qld.gov.au)), Bremer Institute of TAFE ([www.bremer.tafe.qld.gov.au](http://www.bremer.tafe.qld.gov.au)), BNIT ([www.bn.tafe.qld.gov.au](http://www.bn.tafe.qld.gov.au)), Gold Coast Institute of TAFE ([www.goldcoast.tafe.qld.gov.au](http://www.goldcoast.tafe.qld.gov.au)), Mount Isa Institute of TAFE ([www.mtisa.tafe.qld.gov.au](http://www.mtisa.tafe.qld.gov.au)), MSIT ([www.msit.tafe.qld.gov.au](http://www.msit.tafe.qld.gov.au)), Southbank Institute of

Technology ([www.southbank.edu.au](http://www.southbank.edu.au)), Southern Queensland Institute of TAFE ([www.sqit.tafe.qld.gov.au](http://www.sqit.tafe.qld.gov.au)), Sunshine Coast TAFE ([www.sunshinecoast.tafe.qld.gov.au](http://www.sunshinecoast.tafe.qld.gov.au)), Tropical North Queensland TAFE ([www.tnqit.tafe.qld.gov.au](http://www.tnqit.tafe.qld.gov.au)) and Wide Bay Institute of TAFE ([www.widebay.tafe.qld.gov.au](http://www.widebay.tafe.qld.gov.au)).

## South Australia

TAFE SA ([www.tafe.sa.edu.au](http://www.tafe.sa.edu.au)) has campuses spread across the state. A decent range of information technology courses is available.

## Tasmania

TAFE Tasmania has an appalling website ([www.yourchoice.tas.gov.au](http://www.yourchoice.tas.gov.au)), but does offer a number of information technology courses.

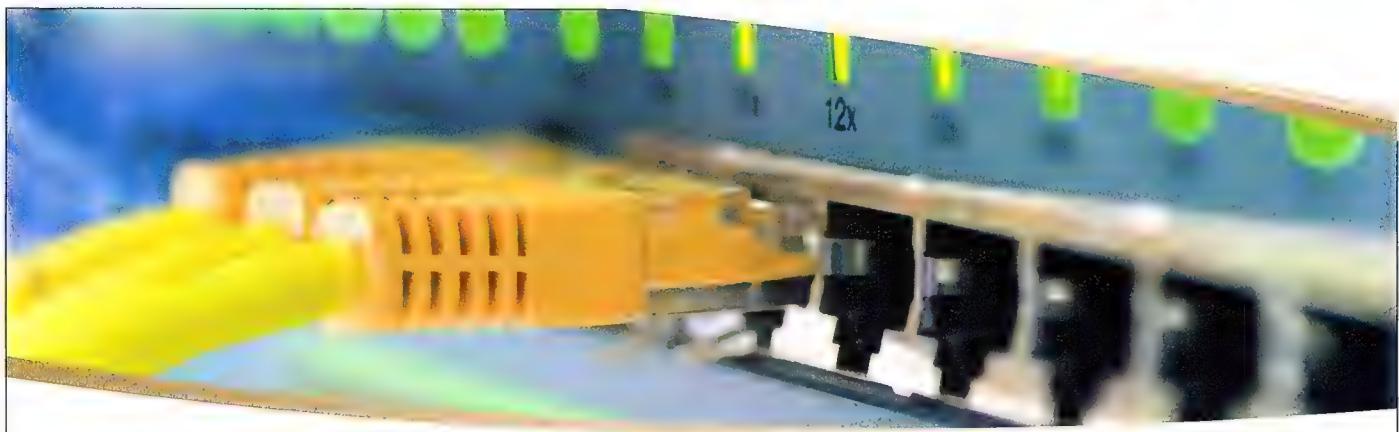
## Victoria

There are lots of options for Victorians. BRIT ([www.britafe.vic.edu.au](http://www.britafe.vic.edu.au)), Box Hill Institute of TAFE ([www.bhatafe.edu.au](http://www.bhatafe.edu.au)), Chisholm Institute ([www.chisholm.edu.au](http://www.chisholm.edu.au)), East Gippsland TAFE ([www.egtafe.vic.edu.au](http://www.egtafe.vic.edu.au)), GippsTAFE ([www.gippstafe.vic.edu.au](http://www.gippstafe.vic.edu.au)), Geelong's Gordon Institute of TAFE ([www.gordontafe.edu.au](http://www.gordontafe.edu.au)), Goulburn Ovens Institute of TAFE ([www.gotafe.vic.edu.au](http://www.gotafe.vic.edu.au)), Holmesglen TAFE ([www.holmesglen.edu.au](http://www.holmesglen.edu.au)), Kangan Batman TAFE ([www.kangan.edu.au](http://www.kangan.edu.au)), NMIT (<http://www.nmit.edu.au>), RMIT University's TAFE branch ([www.rmit.edu.au](http://www.rmit.edu.au)), South West Institute of TAFE ([www.swtafe.vic.edu.au](http://www.swtafe.vic.edu.au)), Sun-

rasia Institute ([www.sunitafe.edu.au](http://www.sunitafe.edu.au)), Swinburne University ([www.swinburne.edu.au](http://www.swinburne.edu.au)), University of Ballarat ([www.ballarat.edu.au](http://www.ballarat.edu.au)), Victoria University ([www.vu.edu.au](http://www.vu.edu.au)) and Wodonga TAFE ([www.wodongatafe.edu.au](http://www.wodongatafe.edu.au)).

## Western Australia

Training WA ([www.trainingwa.wa.gov.au](http://www.trainingwa.wa.gov.au)), which thankfully has a site far less obnoxious than its Tasmanian equivalent, offers numerous information technology courses across the state. 



# Step boldly into the future

### Monash offers you a global perspective.

Choose from a range of undergraduate degrees, coursework masters, graduate diplomas and certificates across all areas of information technology. Research programs, online credit recognition, Industry Based Learning, off-campus study and International Merit Scholarships are also available.

Monash offers cutting-edge research, outstanding academics, superb facilities and a prestigious reputation recognised around the world.

Choose to study IT at Monash. [www.infotech.monash.edu](http://www.infotech.monash.edu)

CRICOS Provider: Monash University 00008C

 **Boldly.**



**MONASH** University  
Information Technology

IF A FRIEND TELLS YOU LIFE SUCKS  
TELL THEM WHERE TO GO

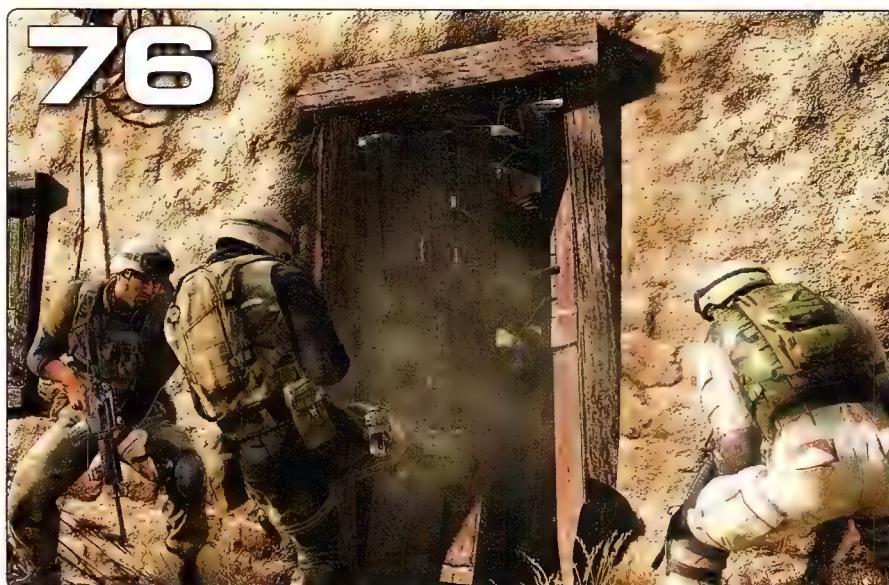


# GAMEPLAY

GAMES, GAMING AND FILM COVERED... ATOMIC-STYLE

Video games have an amazing capacity to get across a story, but sometimes they can take more liberties with truth than a hobo takes swigs of cheap wine. We've taken a huge look into the process behind making the next Medal of Honor game; and have a definite assurance that it's relatively wine-free. While new games are always interesting, one game that has managed to sell

so many copies the developer is practically swimming in a gold-plated, jewel-filled swimming pool is World of Warcraft. Why has it been around so long, and what has happened in the past five years? We find out! On top of that already mouth-wateringly tempting plate of gaming, we throw in Red Dead Redemption, a new GTA game, Avatar and even some Napoleon. Delicious.



Sponsored by



## GAMEPLAY CONTENTS

ENGINE ROOM: Medal of Honor	76
In-depth look at war done right.	
Mod Matters	82
WoW Anniversary Special	84
Red Dead Redemption	88
GTA: Chinatown Wars	91
Metro 2033	92
Avatar: The Game	95



**EVO-M10**

EVOLUTIONARY POWER. EVOLUTIONARY PERFORMANCE.

AVAILABLE IN 550W/650W/750W





# Medal of Honor

**David Hollingworth visits EA headquarters in Los Angeles to meet the team behind the brand new Medal of Honor.**

*"This is a reset – a re-invention of the franchise."*

Greg Goodrich, Executive Producer of the just announced Medal of Honor reboot is very passionate about his job, and about the opportunity to update one of EA's most popular franchises. "WW2 has always been the place where Medal of Honor has lived," he goes on to say when we first meet him for a preview and walkthrough of where the game is at prior to its release late next year. "But not any more."

But what hasn't changed are the game's core values. "Medal of Honor has always been about respect for the soldier, about honouring the soldier. It's about what these guys do. It's not a game about policy, or politics, or wars, it's just a story about a handful of guys – the Tier 1 operators."

## Real Modern Warfare

The franchise's reinvention has lead EA to set the game in Afghanistan, during the war that led up to the fall of the Taliban. It's a real war, and one that's still being fought, which brings with it a host of difficulties – and some rare opportunities.

"Movies have always been the first media to tell a story to a wider audience," said Sean Decker,

ex DICE guy and currently General Manager at EA. Saving Private Ryan was the first film to try and tell the story of World War 2 veterans in a particular way, and the first Medal of Honor took a lot of inspiration and cues from it. "But," Sean points out, "Games are the entertainment

medium of the modern generation, and they can be just as important. So we thought that we could be the first to tell the stories of these men and women fighting in a very difficult war."

Medal of Honor, as a franchise, has always been about getting the right consultants to work





with developers to deliver, if not a truly authentic experience, then at least one as authentic as it can be. For the game's reboot, EA managed to secure unprecedented access to real special forces operators – called Tier 1 Warfighters in US military parlance. Players will be taking on the role of these specialists in-game, so getting the real deal to tell you what an actual Afghani village looks like, or how they really talk while on a mission, is an incredible advantage.

## Game on

You'll take on the role of Army Rangers for some levels, but for the most part you'll be one of the Tier 1 Ops. These are the literal best of the best, the guys who call in airstrikes, make contact with warlords, and go on what are essentially kill missions. But the devs are keen to show how what they call the 'big army' integrates with and

relies upon these operators, and how these operators could not possibly succeed at their task without some serious back up to call on.

"Big army will be represented by the Rangers," says Greg, who's obviously very fond of his subject matter. "Tanks, choppers, all that stuff. The game's about the Tier 1 guys, but they cannot operate alone, and vice versa. What we're trying to show is the relationship between the sledgehammer and the scalpel."

"The tier 1 guys will have the ability to do things," Greg enthuses. "They'll play different, have different gear, and generally operate on another level from the Ranger characters you play."

By time of print, the game is technically complete. But, curiously, Greg is embarrassed by what he was able to show us. "This level, 12 weeks of work, 22 people... and it doesn't look

good," he says as he loads up a demo, but he's smiling. "We get the game done early so the artists and designers can get in and find the fun. In my opinion, the Gardez level just doesn't look very good – it's about 40 per cent done. We're spending the entire first half of next year to make the game look good, and really mining out all the fun stuff."

Which, frankly, is impressive, because already the game's looking very good from where we were sitting in EA's LA offices. The Gardez mission is part on-rails driving, part tight scripting, and a lot of well-paced mayhem. The obvious comparison to draw is with *Modern Warfare 2* (which no one at EA ever mentions by name, but it's the obvious gorilla in the room); there are similarities, of course, but the treatment of the combat is both more nuanced and better-paced.

And you can lean, too, which is kind of neat and innovative... Anyway.

The game features almost no HUD at all so far. You get incoming fire indicators, and a simple ammo counter that fades after you stop firing. Otherwise, it's all just game: sound, impact effects, destructible scenery, some very pleasing knife kills, and just solid, down to earth action.

The Gardez level opens following you and your team clearing a checkpoint, on your way to meet a local contact who has some important operational information. You're all in local





Pushtun garb, heavily bearded, and doing a good job of blending in... to start with. It wouldn't be much of a demo if things went smoothly, and sure enough, an RPG team takes out your lead vehicle, and you're called upon to fight through the ambush and relieve your team leader.

Right away, the impact of the close relationship EA has with the real spec-ops guys is obvious. The dialogue is sparse and hushed; knife kills are sudden stabs delivered without remorse. And the sense of controlled emotion when rounds impact close is ever-present. There's also a tighter sense of teamwork between the player and AI-controlled teammates, especially in one sequence where your partner kills the lights in a building so you can both enter using night vision scopes and IR sights.

Constant chatter from your team leader keeps you updated to their own progress, and as you clear the ambush you actually get sight of them engaging in a firefight, before you take to the rooftops to try and flank the enemy. But as things start to get really interesting, the level – and our demo – ends.

The idea that it's just going to get better is, frankly, mindboggling.

But, as they say, there's a lot of work to go.

## Achieve this!

With the game probably a year away, it's hard to nail down what kinds of content we're going to see in the final version, but we have already grokked a little from our chat with the team.

There'll be vehicle-based missions, for one thing, according to Greg. "In an Apache," he said, "you get a whole other view of the battlefield." He also let us know that EA is looking at new way of dealing with the crack of

**...as you clear the ambush you actually get sight of them engaging in a firefight, before you take to the rooftops to try and flank the enemy.**

the modern gamer, achievements.

"There are multiple really cool things we'll be doing around these Tier 1 characters and their abilities," he said, "to tie into achievements and other things."

And then of course there's the multiplayer angle of the game, which has some obviously very stiff competition from the likes of MW2. Sean Decker, though, is very happy with the challenge ahead of him, and very aware of the stakes involved when it comes to PC multiplayer.

"It's going to be awesome," he says when we

ask him about the game beyond the bounds of singleplayer, "and I'll say this up front - it *has* to have dedicated servers." Sean's passion for the topic is unmistakeable, and he goes on to make us feel very excited indeed about Medal of Honor's multiplayer.

"There's no worse experience than the lobby, and voting, and host migration, and all that. It's a bad experience." Which, of course we totally agree with. And, since we know the game's going to have vehicles in the campaign, we hit him up about vehicles in multiplayer levels.





"Well, with DICE involved," he says, grinning, "I think you can assume we're going to touch on vehicle combat just a little."

We braced Greg on the subject of multiplayer as well. "The way we look at it, is you get the right team for the right job, and we have that. In the end it's like two great tastes that just have to go together, and you have to do it right."

Suddenly, a year seems to be a very long time to wait.

## Game in progress

We got to speak not only with the executive and management side of the game, but also some grass-roots coders and devs in the studio.

Our first thought: Wow – what a cool place to work.

The team has surrounded itself with the

tools of the SpecOps trade. There are posters explaining the working details of dozens of weapons systems, from M4s to Glocks to RPGs. There are location photos, operational planning posters, and whiteboards aplenty for sketching out everything from what order a squad will enter and clear a room to highly detailed to-do lists.

And of course there are weapons, both of the alarmingly real variety (a Colt M4 with tactical rails and foregrip rests next to Sig pistol and a well-maintained AK-47 in a cabinet near the lifts) and happily plastic (Nerf guns are probably much better for blowing off steam than the real ones, and arguably safer).

One of the more revealing posters we got to see was an AI map of a given area, delineating what is cover and what isn't, and how the AI should behave in any given circumstance.

The game's being coded in the Unreal engine, at the moment, and while that brings a lot of advantages, it doesn't bring a lot of smarts. The basic AI in Unreal is, well, basic, so the developers are adding much more involved triggers into the environment. The levels are very porous, with many places to seek cover or advance from spot to spot, so having an AI that can take advantage of that is important.

At the same time, the game also needs to be focused around what the player can see and do, so scripting sometimes needs to take precedence over procedural behaviour. As you read this, that's the main effort – balancing an organic AI that is nonetheless entertaining while still being challenging.

The AI design is so level dependent that the same team is working on a lot of level design. We got to see a coder's eye view of the Gardez demo level; it's so far set to take about 45 minutes to pass through, and while it is essentially a classically linear design of streets the player must traverse, the buildings and shopfronts on these streets are all very detailed.

"It's important that players can see a lot of stuff, that the levels be very porous so that players can do a lot of different things," Lance Powell, the game's lead developer. "But that of course means that we really push our view distance at times. When you're on a rooftop, you can see up to three miles around you."

"And that gets even more important when you get into an Apache," adds Greg.

From there, we got to see the effort that's going into the lighting of the game. In a word – it's impressive. The designers are constantly running up against memory limits per frame, but rather than strip back detail, the aim is to find





## Censorship, politics and understanding

To someone from a country that has a mature attitude toward gaming, the current lack of an R18 rating in Australia must seem a little confusing. With games being censored (like *Left 4 Dead 2*) or pilloried in the media for mature depictions of violence (like *MW2*), it occurred to us that such a sensitive topic as Afghanistan, which is an ongoing conflict, might cause issues.

"We're telling historical fiction," said Greg.

"We're telling the story of a band of fictional characters in a real event."

"The truth is," adds Rich Farrelly, Senior Creative Director. "You make the game you want to make first, and then worry if it's going to tank in a given market." But Greg's not worried.

"We've done over the top before, and we always ask ourselves if we're going too far," he said. "But this experience is not that. It requires the right tone and intent, and it's a story we want to share, and get in front of as many people as possible."

The other ball EA needs to keep in the air is its access to the serving operators, who Greg assured us have 100 per cent veto of what does or does not go into the game. "We heard of this thing that happened," said Greg, "and so we put

elegant workarounds that preserve the great design work that's been fed through to them.

We saw two frames of a scene, from two different render passthroughs, and in just a day's work it's amazing to see what can be done. From a relatively flat scene of a rocky hillside with a scatter of mud huts, we get a brightly lit, sun-drenched view that practically drips with atmosphere. Then we get to see that level live, to look and peer around, and it's even more amazing.

Light bloom occludes the edges of objects; an unsecured tarp ruffles in the breeze, along with the plants on the edge of a path. Hard shadows mingle with dynamic lighting effects to deliver a stunningly realistic location. In fact, we mistook some test renders for location shots, it's that good.

"And all that great lighting? When you get bullet holes appearing in thin surfaces, you'll get point-

beams of light flooding through," says Greg. Of course, the lighting guy (who we interrupted while he was working on getting cloth looking right in night-vision) blanched at hearing that. "Hey, I never promised anything!"

Well, we guess he has now. Even without such detail, the lighting engine is going to be a big part of the game, and Greg went on to say that even if his team can't get such impressive effects into the console version, they should at least be accessible on a PC that meets higher hardware requirements.

The village level also highlighted another aspect of the game that the Tier 1 Ops have been able to influence. There are all kinds of odd details, like hand-woven baskets and lawn chairs on rooftops, that the operators have suggested be included – it all goes toward making it seem as real possible.



# Meeting the Operators

For the original Medal of Honor, EA called upon the likes of Dale Dye, a Vietnam veteran, and numerous World War II veterans, to help deliver a sense of authenticity. For the reboot, the team is going one further, calling upon the experiences of serving Tier 1 operators – in other words, just about the hardest people you'll ever meet.

And meet them we did.

To give Australian readers a comparison, these guys are the equivalent of our own SAS. And like our SAS, because these guys are serving, and likely to be back on mission by the time you read this, we can never know their names, or even see their faces. We met three of them during our studio visit; they were generous enough to sit down with the press (these guys, as a rule, do not talk to journalists) and talk us through why they thought working with EA is important, what they bring to the game, and to learn a little bit about what makes them tick.

But before we met them, we asked Greg Goodrich what lengths he had to go to even get these guys inside.

"There was a lot of back and forth, a lot of talking to a guy, who'd talk to a guy," he said. "It was about gaining trust, and letting them know we would honour what they do, and the people they do it with. When they understood that, they came on board."

Which is a hell of a coup, and still a shaky one. "We know they could leave the project whenever they wanted," he added. "We don't want that to happen."

Which is very fair, because these Tier 1 guys bring a lot to the table.

When they walk into the room, everyone kind of goes quiet. All three of them – who go by the call-signs Vandal, Coop and Pancho – are masked and balaclava-ed; it's obvious these are capable individuals just from the way they move, and when they sit down and look at you you get the real impression they've just summed you up and not found you much of a threat. It's kind of awesome and very humbling at the same time.

## On conveying their work through the gaming medium:

**VANDAL:** The game is meant to be fun, but EA wants authenticity. Whether it's dialogue or

it into the game. But when our Tier 1 guys saw it... they thought we did it well, but they also told us that there are maybe four people in the world who even have the right to tell that story." Greg looked solemn for a moment. "So, yeah... We let that scene go."

## The war must go on

We've not even seen a final product yet, but already EA's looking well ahead. Call of Duty has most definitely eclipsed Medal of Honor as the

gear or certain actions, maybe the more visceral aspects – it's incumbent on us to help them, but to do it in good taste.

## On whether the game trivialises what they do:

**PANCHO:** EA brought us in to keep the game in check.

**VANDAL:** If it's about honour, no, it does not trivialise anything. The franchise has developed to what it is today, and we have the opportunity to continue to shape it. It's too often that we see in the news today, or read online, that the public is being force fed certain aspects of the war on terror. Politics aside, certain abuses and scandals... working with the gentlemen that I have, you get a different attitude. It's easy to focus on the negative, but throughout life you create your own symphony, and you hope your actions work for the good of things.

Politics aside, there are good men out there doing good things, despite the blemishes of some individuals. We have ardent belief systems – we believe our cause is just.

**GREG:** We've made this game not about politics or planning or even the war on terror. It's about these guys doing their job well. This game, this story, is about those guys.

**VANDAL:** We've had the opportunity to erase a lot of misconceptions.

If you're on the business end of my weapon system, you belong there. But I'm not a killer. It's not about glorifying what we do, and we're getting that across.

## On what drives them to excel, and what makes them tick:

**PANCHO:** It's something you're born with. It's a feeling of never being satisfied with who you are – you want to shoot faster, shoot more accurately, and you're always looking for ways to get there. So you join a SEAL unit? What then? You want to be around people who have the same thoughts, the same drive.

It's like having an appetite, and never be able to fill it.

## On the mental challenge:

military gaming franchise, but you cannot help but get a sense that Greg's team is ready to fight back. "We've set ourselves a very high bar for the quality of the execution," said Rich when we asked him not only about commitment to the brand, but also to the brand on PC. "Greg and I are PC gamers from way back, so that's a community we do not want to upset."

Understandably, they're hoping this commitment leads to success, but what then for Medal of Honor?

**COOP:** As you go through the door of these units, the screening process itself cuts out a lot of people. All that stuff that looks sexy, but it's not that much fun. It's uncomfortable. And you end up living in a fishbowl, closed in like any tight group – what's odd to other people is everyday to you. I go to work, and all of this training makes these people your brother, and that process of brotherhood takes you higher – you don't want to hold your team up, be the slowest or last. It's like the fiercest competition you can imagine, but a good one, that forces you to lift, and helps you get to the right level.

You forget you're doing all this cool stuff – jumping out of planes two or three nights a week... It gets routine, even when things go wrong.

**VANDAL:** The candle burns brighter. You begin to realise that home is right here, the guy next to you. He knows more about you than you probably know about yourself.

## On being confident:

**VANDAL:** Nuclear proliferation is a threat, so who do you want kicking the door in? Some guy who questions himself, or a very confident, capable man. I am an instrument; what happens to me is my reputation, my work ethic, and my skill, and that what drives me to succeed. I believe in everything we're doing, and it's noble and just.

## On working with EA:

**COOP:** Ultimately, the game's coming out anyway; but this way we get to have our hand on the tiller. We can have some say in the product.

**PANCHO:** Greg and his team have been real good at respecting our thoughts, and doing the right thing by the spec-ops community.

**GREG:** It's important to EA at all levels.

**VANDAL:** You see in other games or movies... all this made up dialogue, but the language and communication between us is very surgical and methodical; but it's boring. So we need to work with the designers to keep it real, and still entertaining.

"If I'm around for very long," said Greg, "I really want to broaden it up. It's not about the medal, it's about the honour – I would love nothing more in the future to open it outside of the American soldier." Could he mean...

"Absolutely – we'd love to cover some other nationalities, and your Australian SAS guys are meant to be some of the best. That's what the Tier 1 guys told me when I said we'd be bringing some Australians over for this preview."

And wouldn't that be something? 

# MODIFICATION

with Ashton 'There's a mod for that' Mills



## JBTextures 2.1

Game Dragon Age: Origins

URL [www.dragonagenexus.com/downloads/file.php?id=15](http://www.dragonagenexus.com/downloads/file.php?id=15)

With the release and subsequent popularity of Dragon Age: Origins you can bet your Hip Flask of Drunkenness +10 that modders were going to dive right in.

At the time of writing, there are already 270 mods available, and while 90 per cent seem to be re-makes of Morrigan's looks (just a wee bit of teen angst there) there are a number of excellent game-altering mods.

And none more visually impressive, or gigantaneously large, than the JB (Just Better) texture pack. If you're playing on the PC you may have noticed the high-res textures included in the game kind of aren't, well, high-res. Your eyes don't deceive you, for Bioware accidentally shipped the game with a whole swathe of high-res textures incorrectly replaced with medium-res ones. Bioware has so far made no commitment to fixing the issue and very likely won't due to the size such a patch might be.

And so it's left to the modders. The JB texture pack resizes and sharpens the original game textures which, while they aren't as good as high-res original sources (which only Bioware can provide) they are none-the-less a noticeable improvement over the current ones.

Put simply if you're playing DA:O on any half-decent system, you need this mod. As it replaces a good chunk of textures in the game be warned it weighs in at just under 750M compressed for the basic pack, with another 600M compressed of updates and optional upgrades (such as the very high-res terrain pack). If you opt for both kit and kaboodle they'll all install to an impressive 3200 files totalling more than 3GB.

Such is the price of quality gaming, fairly paid for an experience worth having.



# High Resolution Pack 4.0

Game Duke Nukem 3D  
URL [hrp.duke4.netr](http://hrp.duke4.netr)

Well, this is the last we'll see of Duke. So lets enjoy it – and leave aside that Forever really did live up to its name, much to our loss.

Here, instead, is an up-to-date modern re-creation of the now quite-dated original. But don't let that put you off. As long as you don't expect Modern Warfare 2 play style and graphics, you'll have a blast with Duke's humour, the tongue in cheek characters, and solid gameplay.

After all, you know it's good when the screening at the local cinema is called *Attack of the Bleached Blonde Biker Bimbos*.

The High Resolution Pack adds new textures four times the size of the originals, replaces the sprite-based enemies and weapons with actual models, adds a new soundtrack, and even



updates the original engine with EDuke32 – a cross-platform port (yes Windows and Linux) from DOS with support for OpenGL hardware acceleration, and Duke-sized resolutions like 3072 x 2304. There's even a mod for EDuke32 itself that adds a *gravity gun* – this from a game engine that was around before Windows could even run games.

The high-res textures propel Duke Nukem 3D almost into present gaming, but you'll still notice the very low-poly level design that was a must all those years ago. Look past this however and the pack will give the game a fresh lease – and if you played the original, you'll know it's worth revisiting.



The month's essential patches.



World of Warcraft Hotfix Patch v3.3.0 to v3.3.0a for Mac OS X

Wolfenstein Dedicated Server Patch v1.2

Wolfenstein Patch v1.2 New!

Advanced Warfare 2 Patch Build v4.20

Atlantica Online Patch v21306 to v21405

Borderlands: Zombie Island of Dr. Ned DLC PC De-Authorization Tool

Borderlands Patch v1.1

James Cameron's Avatar The Game Patch v1.01

A.C.E Mod Patch for ArmA 2

Warcraft 3: The Frozen Throne Patch v1.24b to v1.24c

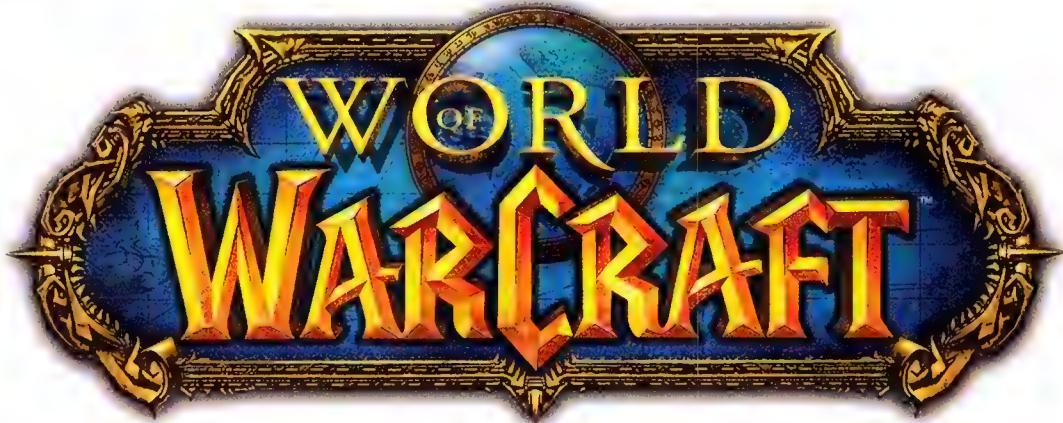
Dragon Age: Origins Patch v1.02

The Lord of the Rings Online: Siege of Mirkwood Patch

EVE Online: Dominion Patch v101786 to v117956

Duke Nukem 3D is bargain bins now, if you can find it, but otherwise it's downloadable from a range of online stores like [gog.com](http://gog.com) for five bucks, or try it out with the free shareware episode. The last official version of the game was the *Duke Nukem 3D ATOMIC* edition. So there you go, it's even got the Atomic blessing, you've got no excuse not to try it out! ☺





# WoW, five years, huh?

Five years is a long time in gaming. **Seamus Byrne** speaks with three of the top men of Warcraft to find out why their World is still rocking socks off.

**L**et's invent a 'dog year' for videogames. We're going to run with 20 years for now. And death means 'not really played much anymore'. Feel free to debate the concept at your leisure. Sure, that means most games die young, but a lot of games are also steaming piles. Then there's a few that blow our maths out of the water. Like just about anything Blizzard creates. And with our trusty new patent-pending dog years for games, it's time to charge our glasses for World of Warcraft and its 100th birthday!

That's a five year anniversary in human currency, of course, but its impact on the industry and its power in the marketplace mean its shadow will be cast far into the future of gaming. Interesting then to realise World of Warcraft came about thanks to a cancelled project, Nomad, that let the team involved choose a new idea to explore: a massively multiplayer roleplaying game.

Jeff Kaplan, former Game Director on World of Warcraft, points out a lot of people at Blizzard were playing other MMOs at the time.

"There were a lot of fans of Ultima Online, a lot of Everquest players, Dark Age of Camelot players," says Kaplan. "A bunch of hardcore gaming fanatics who just loved what was going on. [When] that team switched over to working on World of Warcraft a lot of that was inspiration from the early MMOs the team had just been big fans of."

Development on WoW had started before Warcraft III was in the can, so it's interesting to know that some of the story development in Warcraft III was adjusted to keep in mind where WoW was going to take the storylines.

## Shifting the benchmark

"When we were working on the game early on," says Kaplan, "we used to look at games like Everquest and their subscriber base of a few hundred thousand. We thought that would be a massive success."

Oh, how naive they were. When World of Warcraft first appeared at E3, it was beaten for Best in Show by... Star Wars Galaxies!

"I remember the team came back and they were feeling very demoralised," says Kaplan. "Mostly because we were these huge Star Wars fans and we were all looking forward to Everquest 2 coming out. There was a lot of grumbling about how we were never going to compete with these games."

Then Lead Designer, Allen Adham, one of the founders of Blizzard, took this moment to plant a marker in the sand.

"He stood up in front of the team and said, 'Guys, we are going to have a million subscribers on this game'", recalls Kaplan. "He gave us a very inspirational speech about how hard we were working and how great the game looked and how talented the dev team was. We were only about 40 people at that time, and I remember afterward feeling very inspired, but

also thinking, 'Man, Allen is crazy! There's no way we, or any game, is ever going to have a million subscribers!' The fact that he was right, and right many times over, is a testament to his vision behind the company."

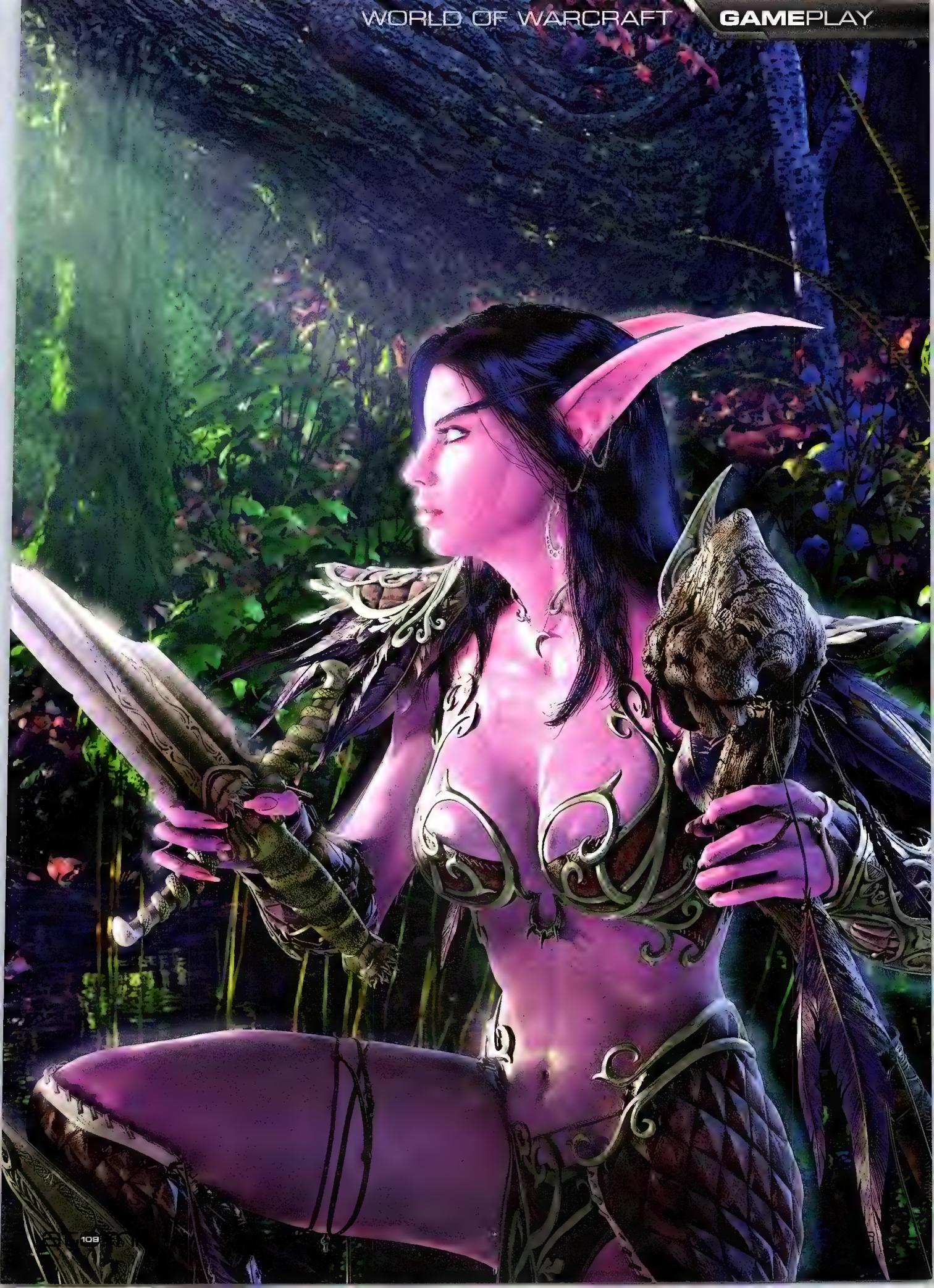
## Changing engines mid-flight

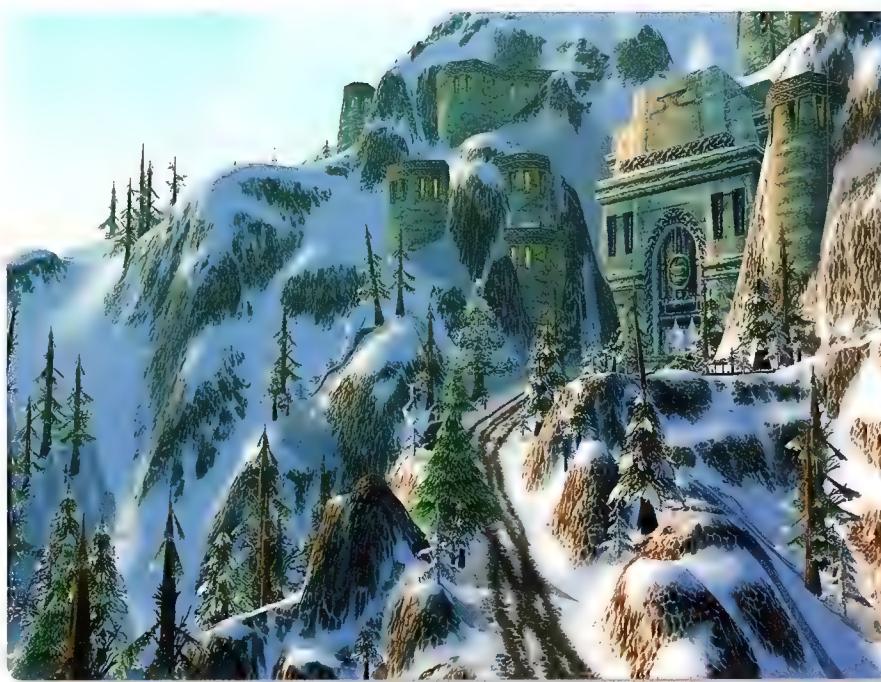
Perhaps the greatest achievement of World of Warcraft has been its excellence in evolution. Five years on, the game still attracts new fans, still draws old fans back, and manages to keep itself fresh in the face of changing tastes and desires.

While many features have changed, it's even more significant to see that almost the entire World of Warcraft engine has been ripped out and replaced, more than once, since launch.

"We sort of think about changing out the engine on a live game as being a similar sort of difficulty as changing an engine on a plane that's







already flying," says J. Allen Brack, Production Designer. "So it's definitely something we do with care and caution."

Animation systems, shadow systems, and a new water system are coming online when Cataclysm arrives in 2010. Plus they're just getting better at building environments.

"We have a lot of terrain enhancements, and a lot of ways that we construct zones that are far superior today to what it was in the original game, and we're really looking forward in Cataclysm to bringing a lot of that technology to the old world."

When pressed on what some of the most important technical updates will be to the 'old world', as they call it, to support features like

**There's several quests in there that have a little moral ambiguity, where you think, 'wow, I'm really a bad guy, maybe this is not the path I want to go' ...**

flying, the answer points to what happens on the set of classic Western films.

"What really needs to change for flying to happen is that there are parts of the world that just weren't finished," says Tom Chilton, the game's current Game Designer. "There were parts of the world that we didn't work on, because you couldn't get there and you couldn't see there through your normal play experience."

"If you were to be able to fly over the mountain ranges and you could see there, it would look really odd. It's unfinished, people wrote stuff on the ground, and stuff like that."

"That even goes for some of the cities," says Chilton, "areas just built as façades because there's no reason to spend time on the backside of the façade when no one would ever see it. Also to be more efficient, so you weren't needing to draw more polygons than you needed to draw."

"Then there are all the things we are trying to do to bring the quality of the old world up to the quality of what you see in Northrend and even some of the newer stuff that we're doing that we didn't even do in Lich King. That's just our desire to update things and make it look cooler than it ever did before."



Kaplan steps in to point out there's a nice sense of homecoming for the developers, too.

"We spent so much time in what we call the old world, the Eastern Kingdoms and Kalimdor," says Kaplan, "the idea of being able to go back and touch that up and make that area that we love so much relevant again. So much of the player base went to Outland and then to Northrend and the idea of bringing the player base back to Kalimdor and the Eastern Kingdoms is really exciting and appealing."

## The MacGyvers of WoW

Let's pay some serious credit where it's due — World of Warcraft would be nothing without its thousands of quests to give you reasons to keep killing boars, collecting entrails, and retrieving vials of liquid.

Chilton points out that the quest team has rarely changed since launch, so that continuity means they have worked hard to expand the possibilities of quests, and keep finding new things for players to do.

"I think they have just been getting better and better over time at doing more. And the tools

have improved over time, so now they have more technology available to them, they have more efficient tools available to them to do things that before either would have been impossible or way too time consuming to pull off."

"We think of our quest designers as sort of the MacGyvers of the team," says Kaplan. "We can give them a bucket of silly putty, three bobby pins, and a pen, and say here make a fun game with that. And hey! Look at all these thousands of quests!"

"We've also tried to make sure over time that we have made the storyline more visible to the player," adds Chilton.

"If you did the Death Knight starting experience with Lich King we feel like we really hit a high bar," says Kaplan. "There's several quests in there that have a little moral ambiguity, where you think, 'wow, I'm really a bad guy, maybe this is not the path I want to go down'."





The other notable development the Death Knight introduction showed us was phasing, a new technology that allowed individual players questing in the same area to see completely different versions of what was taking place in the zone. And it seems our MacGyvers were the ones who made this technology happen. It was never a planned feature for Lich King, but the quest designers forced the engineers to give them a new set of creative tools.

"[The quest designers] were using invisibility as a means to try and tell a story in an area," says Chiltin, "and they would want one thing to be visible and another thing not to be visible. They would put conditions on actual types of invisibility. Soon they wanted to do more and more complex things to show a more dynamic world and our engineers worked closely with them to come up with a system that was way more robust than just making things visible or invisible or falsely teleporting people."

"So it really started with the storytelling ideas of the quest team and it was fully realised when the engineering team made it their problem as well."

## WoW's greatest hits

With three of the most important names in World of Warcraft at the table looking back on the

game so far, we just had to find out their greatest moments in the history of the game.

The first goes right back to the beginning, with the amazing world event that saw the team have fun destroying the beta test. On the live server, Blizzard started dropping all kinds of nasty creatures all around the world in an apocalyptic final fight before the beta went dark.

"The end of the beta was awesome," says Kaplan. "That was definitely a personal highlight for me. Tom [Chiltin] and I shared an office at the time, and we were dropping all sorts of wacky creatures. I remember pulling Cannon Master Willey out of Stratholme. He doesn't leash, ever, because he's made to only be in Stratholme. He trekked all the way from Orgrimmar, then he was

in Razor Hill, then the Valley of Trials. I realised the Cannon Master was going to make his journey all throughout Kalimdor unless we put an end to it."

Chiltin points back to the introduction of the talent system and watching players explore all the new possibilities that offered.

For Brack, he sees the zombie invasion event — an intentional event based on the unintentional blood virus incident from Zul'Gurub — as his highlight.

"There was some outcry from certain players when we did it, and we knew there would be. Because the whole server became zombified toward the end of that event as it was running its course. But that was a truly awesome, epic, world changing type of thing."

## Epic goes up to 12

The most satisfying part of talking WoW with its lead designers is just how much fun they're still having making this game. There is no sense of boredom, or going through the motions, when it comes to talking about what has been and what is still to come. But how much more epic can the game get?

"We've got a lot more purples to hand out, that's for sure!" says Chiltin.

"We've got a lot more stories to tell," says Brack. "More bosses people haven't heard of, more lore characters people haven't heard about. Arthas is certainly a big Warcraft person, but he's just in Warcraft III. So we're excited to tell Deathwing's story, who's been around since the Warcraft II days, and go from there."

Final question: how big are the pauldrons going to be on a Tier 12 set of gear?

"They're going to fill two and a half zones," says Kaplan.

"But people are going to have much bigger monitors by then," says Chiltin. "So it'll be okay." 





# Red Dead Redemption

We get another tease of this promising open world western adventure...

**[PREVIEW]**

We saw some of the cactus and dust flavoured action that Red Dead Redemption's promising gamers in the middle of last year. We were suitably impressed, and now that the game finally has a release date – April this year – Rockstar's been treating reviewers to some more preview time, and we're still getting tingles at the thought of this extensive open adventure from the same guys who brought us the iconic Grand Theft Auto IV.

To recap, RDR puts you into the worn cowboy boots of John Marston, a reformed outlaw who's been forced onto the trail of his old gang.

It's a touch generic, but then again – this is a western. It's a genre that's all about well-worn tropes and ideas, so having a plot that reinforces that sense of period and drama is a necessity, not a burden.

What's more, the game's set not in the golden age of the western – around the 1870s – but rather at the turn of the century, when encroaching industrialisation was slowly blotting out the old west. If anything, the game feels a lot more like Sam Peckinpah's seminal *The Wild Bunch* than any other film – though fear not, the game's creators are very aware of the entire oeuvre.

## Open plains

While there is a strong, 40-odd hour single-player plotline to explore, a lot of the side content will consist of procedurally generated

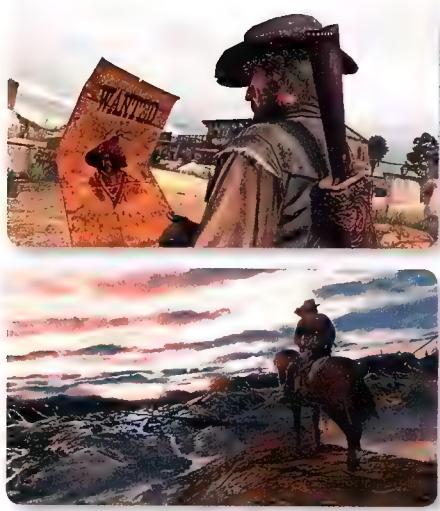
content. One of Rockstar San Diego's main aims in the game was to never overwhelm you with an intrusive interface – there's no mission select screens or similar, or much beyond the basics of game UI, like health and a mini-map, to distract you.

Instead, as you ride the range, stuff will just happen around you. You'll see other riders on far ridge lines, any of up to 40 wild animals to run away from or hunt, carriages, accidents... all kinds of stuff, in fact.

For our preview – which was hands off, but with very obviously live code – the first thing we saw after breaking camp (which is the game's save mechanism, by the way), was a group of Mexican Federales executing some hapless political prisoner. We could have intervened, and started all kinds of mayhem, but instead we just watched on as some poor citizen was roughly shot in the back before the Federales mounted up and galloped off.

Of the game's three regions, the southern-





most is a fictitious Mexican province, rife with unrest, poverty and brutal law – so the generated encounters south of the border will have a very different feel from those in the two more northern regions.

After riding along in the dust of the Federales for a while (and staring at the odd sight of three travellers galloping the other way on two horses and mule), we arrived at a small town, one of the many hubs spread across the game. Here was a market, various shops, a cantina, the local wire office, a railway station (train travel is a faster way of covering ground), and of course the local law enforcement's official office.

## The virtual arm of the law

Here, you can keep an eye out for bounty posters – these are simple catch or kill quests, with a range of rewards.

There's no system of morals in RDR, but the game does track your reputation – how well known you are – and how honourable you are. You get rep for completing story elements, and your honour is a measure of, well, being a nice guy. Take a bounty to bring in a man dead or alive,



and make the effort to bring him in alive, and your honour will tick up. Shoot the same guy from a bluff overlooking his camp, and you'll not get any benefit – apart from the easy kill and the reward.

The two can combine, so that when an entering a town, citizens and shop owners will know of you based on your rep. Get a high enough honour, and you could find people

coming to your aide when you're in a tight spot.

So, having secured a shiny new bounty notice – which Marston physically takes down from the wall and folds away into his inventory – it's off into the boondies for a bit of trouble.

On the way we also get to play around with the treasure hunting system, which is another one of the side content quest types you can indulge.

One of the loot types in the game (alongside more guns and knives, ammo, outfits and more) are maps that can lead you to numerous treasure caches. These range from classic X-marks-the-spot type deals to the map we got to see – a simple sketch of a rock formation and an arrow pointing to a rockfall. It could be anywhere, so it's the kind of thing you just need to keep an eye out for. Thankfully, our tame playtester knew (a mystery, I'm sure) exactly where to look, and we were blessed with a gold bar and another treasure map.

With so many types of content in the game, RDR keeps track of the types of missions you like, and always makes sure there are lots available, and of ever increasing difficulty. As we ride on from our gold depository, we come across the camp of our bounty, and a rollicking gun-fight ensues. It was day when we headed out, but now night had fallen, leading to a





dramatic torchlit confrontation in a dusty arroyo. The game's combat has tightened considerably, allowing for much better accuracy, and with some fantastic sound and impact effects. One whole mess of dead Mexicans later, we pick up our loot and head back into town.

## Mexico by night

The day/night cycle is about more than just standing on a cliff and looking dramatic – it also changes the way our little town looks and feels. The stalls are all closed up, and folks are relaxing. There's music coming from the cantina, local ladies of negotiable favour strolling about, and even a few fights starting from too much tequila.

With our bounty cashed in, we get into the last part of the demo – the game's Wanted system. Whenever you break the law – in this case, shooting down some Federales about to intimidate some local workers – you end up with a bounty on your head. Initially, it's a very similar effect to that in GTA. You have a wanted radius, and any local law types will chase you down as long as you're in line of sight.

However, your wanted status doesn't simply go away – it's persistent. You can pay your dues to get rid of it (say, if you're worth \$150, you can



simply pay that and be clear), seek out a pardon (a special reward for some missions) or just live with being wanted. You'll get posses coming after you, and hanging around towns will be tough, but you're an ex-outlaw, right? It's all part of the charm.

We're expecting to learn more about the game's multiplayer mode in the coming

months, but already we're looking at Red Dead Redemption as one of the games to play in 2010. It's only coming out on PS3 and Xbox 360, but even we're not immune to the charm of a good console release – and this is looking to be all that and more.  DH

Xbox 360, PS3 (previewed on 360)

Developer Rockstar San Diego  
Publisher Rockstar Games  
Website [www.rockstargames.com](http://www.rockstargames.com)

✓ Wide open world; many mission types; gritty combat and atmosphere.

✗ Could be 'too much' game.





# Grand Theft Auto: Chinatown Wars

Interesting storyline, but ultimately marred by the platform.

Grand Theft Auto is one of a few series in the gaming world that the vast majority of the population would know about. Whether they've actually played it, or simply heard about it during multiple 'Hot Coffee' and other violence news in mainstream media, it's definitely one of the more controversial games out there. Chinatown Wars harks back to the first two games, providing a nice split between the 3D style of the more recent releases and the top-down view of the originals, set in the fictional American city, Liberty City.

Slipping into the shoes of Huang Lee, you land in Liberty City to be immediately shot in the side of the head, stuffed into the back of a car and dumped in the ocean by two guys who don't appear to like you very much. From here you're taken into a tutorial, giving the basic movement controls a workout. Unfortunately due to the platform they're very awkward; using the teensy joystick nub to move Huang around is frustrating, something I immediately changed to the D-pad in the options menu.

From there you're led on a rollercoaster of missions in standard GTA fare, taking you drive-by against competing gangs, racing with racers in their souped-up Japanese cars, performing hit-and-runs for collection money and even obliterating a business that refused to pay protection money with a bunch of flaming molotovs. The pace is frenetic if you throw yourself against the story missions back-to-back, and the storyline is explained through simple 2D images with captions. This is an interesting way to get it across, but sadly it takes a few seconds to load each cutscene, ripping you out of the

game in the process.

However once you've sunk into the campaign there's enough variety in the missions to keep it from feeling too stale, especially if you've played a lot of GTA in the past. Earning money can be done in the usual steal-a-taxi-and-get-fares way, but another mechanic that has been introduced is the wholesale trade in drugs. Acid, weed and harder stuff can be bought and sold with dealers all over Liberty, each peddling their wares as dirty as an unwashed hobo, and amusingly freaking out if a cop walks by. This mechanic is worked into the storyline, so you'll need to get a hang of the system early on to progress very far in the game; made more difficult by random drug-busts from the men in blue.

Evading them has taken a new turn as well, and instead of simply evading the cops until your wanted level evaporates you're instead tasked with a Burnout-style goal to smash as many of their cars into walls or oncoming traffic as possible. This is a nice idea, but you'll still wind up battling with the controls at some points – and the top-down camera can mean that buildings or trees will get in the way. Battling on foot is no different, with an easy lock-on system otherwise diminished by the awkward camera.

Rockstar has pieced together a nice-looking world rendered in relatively smooth 3D, but thanks to it being co-developed on the Nintendo DS there are some tradeoffs that are clearly visible – cutscenes are unvoiced and use identical artwork, while missions are almost identical. Hijacking and bypassing car alarm systems is intuitive and fun on the DS, while on the PSP it's merely annoying. That said, the PSP

does get quite a few radio stations with plenty of tracks, and some extra missions to play with.

Where the game is let down most is the long loading times, and when the game autosaves after a mission you can have waits of up to five seconds. Loading new missions is jarring, leaving you waiting with nothing to do. This is particularly annoying as it is noticeably longer than most PSP games, and will prove frustrating with hard missions that require multiple attempts.

Chinatown Wars is a great game overall, let down in some areas, but ultimately it's worth a go if you have a burning need to get back into Liberty city from another perspective. **76% JR**

## PSP (also on DS)

**Developer** Rockstar Leeds  
**Publisher** Rockstar Leeds  
**Website** <http://www.rockstargames.com>

**Graphics**  
 Nice artwork, simple cutscenes, solid framerate.

**Gameplay**  
 Great missions, long loads, frustrating controls.

**Sound**  
 Plenty of music, no voicework, otherwise identical to the DS.

86  
70  
75

**Overall**  
 Decent fun, but it still feels like something is missing.

**76%**



# Metro 2033 [PREVIEW]

Another grim Eastern European first person shooter, but is it just STALKER by any other name?

**M**etro 2033, first shown to game journo's last November at a Russian preview event (just the rumours of which make our collective liver hurt), is a game with a fascinating pedigree. Being Ukrainian, a shooter, and sharing some of the same crew that developed that other Russian dystopic epic, STALKER, it seems like it would be easy to draw comparisons. It's an easy bow to pull, in fact, but there's another game you might want to look to for comparison - The Witcher, an excellent game that also started life as a work of fiction.

Metro is based on a series of books by Russian author and journalist Dmitry Glukhovsky. He wrote Metro 2033 in 2002, and at first it was released online, for free - it was a huge hit with internet audiences, garnered a cult following in Mother Russia, before finding its way into print, where it became a best seller.

Glukhovsky's a fascinating guy. He's a journalist by trade, and through Metro he delivered an effective critique of the modern Russian system - Russian artists love allegory. He's published a sequel, 2034, and released it online a chapter at a time, as well as collaborating with other artists to make a complete multimedia project. Thankfully, before the game comes out in March, we'll be seeing an English translation hit Australian shelves - from our recent hands on look at the game world, it looks like it might be worth picking up.

## Not all vodka and roses

The premise of both book and game is simple - the world has turned to shit after a nuclear war, and now the survivors are forced to live underground (in Moscow's old Metro tunnels - get it?) in fear of overland marauders and strange tunnel-dwelling mutants alike. Again, this sounds very familiar... it's got the post apocalypse feel of STALKER, with a healthy smattering of Fallout. But both are entirely superficial likenesses. Metro 2033 is very much its own game.

You play the role of Artyom, a young member of one of these underground communities. At the game's start, you appear to be part of an operation to recover something on the surface; this is both tutorial (so expect all those classic "You've fallen down a hole! Here's how to use a ladder!" kind of shenanigans), and prologue, as the operation goes horribly wrong when you and your team are over-run by evil dog-like things and flying demons. As the screen fades to black, we're treated to an ominous subtitle: 'Eight days earlier...'





This kind of storytelling trickery is interesting, but in media res really works best for non-interactive media - or at least it needs a slightly more deft hand. Too many instances of a player asking of a game "what's going on?!" can really get in the way of suspension of belief. But with the prologue past, a lot of things - though not all - start to become clear.

For something that's being touted as very much an action game by way of a PC shooter, there's a lot going on, and it takes a lot of dialog to get it across. At time of preview, though - and this might just be our ear for accents - it sounds like the entire voice pool consists two Russian men and a very spooky child or three.

But it gets the job done. You see, apart from the horrible radiation and what-have-you

above ground, the mutants are getting worse. In fact, it's entirely possible that they are the next superior evolutionary step - that's what one NPC posits early on, and it nicely sets the tone.

## In Russia, tunnels walk in you!

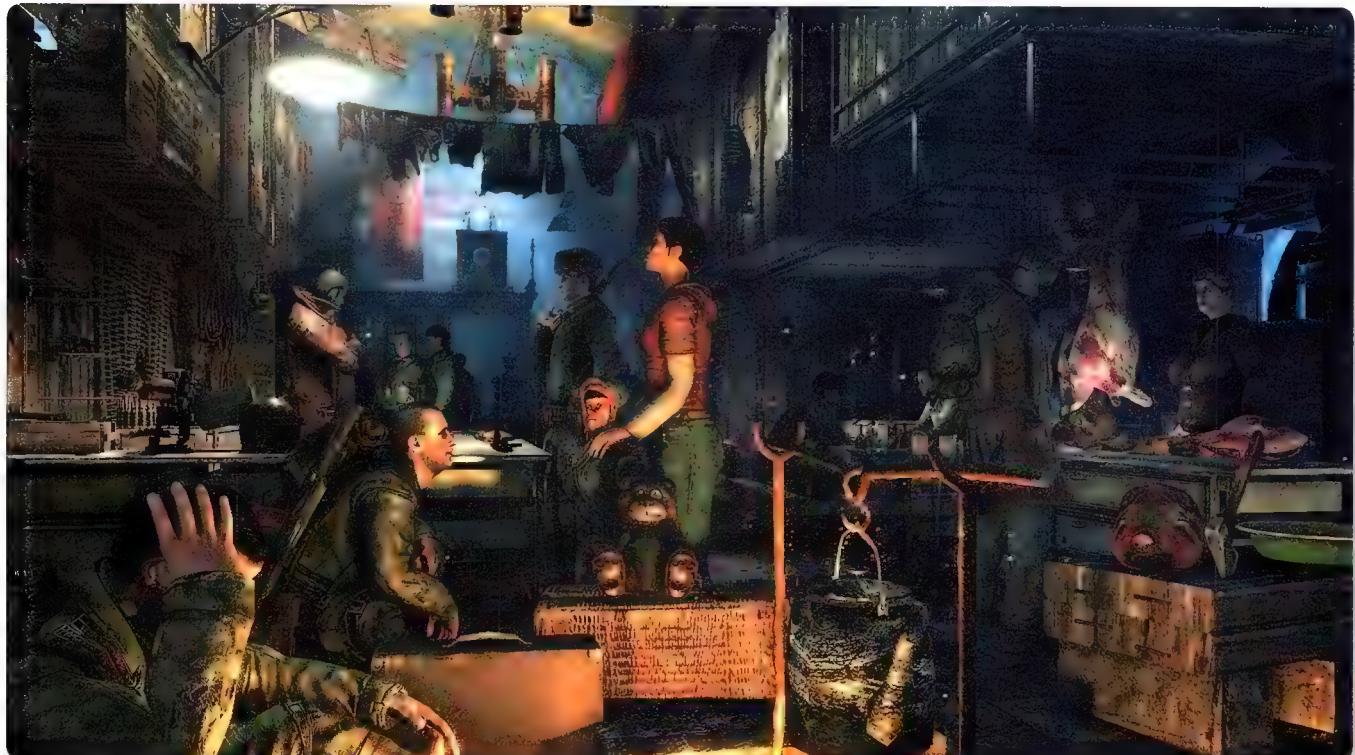
Much of the early game is set in claustrophobic tunnels - they're either packed cheek-by-jowl with fellow tunnel-dwellers (who are all going about daily work - raising kids, gossiping, selling junk), or empty, spooky sections that it's best to traverse with a loaded gun and a ready torch.

After an initial attack on your dwelling by mutants, you head off looking for help. With the controls mastered, this section introduces you to some other game mechanisms - most

notably, the economy. While the game lacks the detailed inventory of STALKER, it does have an interesting take on a post-nuclear economy - everything's value is measured in the most common caliber of ammunition. This is pretty sweet; it shows the kind of thinking going on in these threadbare communities, and leaves you with an interesting choice early on. Do you hoard ammo, or upgrade to bigger and better boomsticks?

The weapons themselves are quite interesting, often cleverly showing in easy visual terms how many rounds remain. The early SMG, for instance, features a skeletal magazine that works its way through the weapon's breach - full clip goes in, empty one comes out.

And before you get too worried by STALKER's





peashooter syndrome (man, did that game have some of the most inaccurate and underpowered weapons EVER), the guns in Metro are pleasingly powerful - even early weapons pack a punch that can single-shot mutants, or knock a bandit off their feet.

In combat you'll need to be clever, too, as positional armour can be very effective. Helmets and masks can deflect rounds, and off-center shots might only wound. The AI seems to make good use of cover, so running and gunning will merely get you killed early and often.

## Clever Russians

The system of barter via bullets is not the only clever mechanic in the game. Trips above ground are only possible wearing a filtered gasmask - it's your classic timed oxygen-supply-style mechanic, but like many things in Metro, you don't get a UI timer. Instead, every time you don your mask you set a fifteen-minute timer on your wristwatch. Checking that time is only a keypress away, but it brings up your left wrist, and takes your weapon out of play.

Similarly, you have a map-folder and a lighter. When you open your map, you stow your

weapon and hold each up in one hand. It's like Far Cry 2, to an extent, but with a couple of added twists. In dark areas, you'll need to right click to open the map, and left click to use the lighter. You can use the lighter by itself, too, as this is directional tool to point you to your next objective - the flame wavers in the direction you need to travel.

There's a lot of idiosyncratic design in Eastern European games, but it usually accompanies great touches like this.

Of course, you still get those idiosyncrasies, like the fact that every second room has either a guitar, or a guitar player in it - a hold over from the STALKER dev team, no doubt.

## Looks can kill

Finally, we've got to give big props to THQ, the game's publisher. Most previews these days run on console, but we got to see the game on PC. And it's looking stunning. Any veteran of STALKER knows that these guys really know how to develop an engine, and this is no different. The detail in each NPC's gear, or the quality of the ragdolling, down to the play of light and dark in the tunnels, is exquisite - and there's

lots of room to bump that detail up and down, too.

At the time, we were playing the game on a laptop. But even at max detail settings and 2x AA the game still delivered solid frame-rates and awesome detail.

Metro 2033 is a couple of months away from release, and is no doubt still going through the final tweaking phase. We're confident that this could go way beyond STALKER - a great game, but with some serious flaws. Not only is this a competent shooter with a great story - it's also atmospheric, and it times downright spooky. It's also an excellent window onto the Russian mode of story-telling, and of game design.

As you can probably tell, we're looking forward to that final code. You should too.  DH

PC and Xbox 360 (previewed on PC)

Developer 4A Games

Publisher THQ

Website [www.metro2033game.com/en](http://www.metro2033game.com/en)



Great graphics; in-depth story; doesn't play like a port.



Dialogue a little spotty; story a touch dense.

### Anticipation rating

We're certainly looking forward to exploring more of the Russian apocalypse.

**87%**





# Avatar

The movie is pure spectacle, but can this film adaptation deliver the same thrills?

To cut a long story short, we were pleasantly surprised by Avatar, the film. You can read our review later on in Culture Shock, but suffice to say it's a pretty impressive bit of film-making. So, while we normally don't relish the chance to review movie tie-ins, we might have let ourselves hope for a little more from Avatar the game. Was it a good move?

Probably not.

In its favour, unlike many tie-ins, the game developers had two years of access to the same assets that were being used to make the movie. Usually, this kind of product is a real afterthought, but Avatar does at least feel vaguely polished as a gaming product, thanks to some great art design and some supremely lush environments.

It even has some unique gameplay mechanics, the chief of which being that you can choose early on whether to support the strip-mining, Na'vi-killing RDA, or go native and help the Na'vi overcome their human oppressors. Sadly, while that's a helluva choice, once made all suggestions of moral challenge go out the window – a few more choices like that would not have gone astray.

The lack of those kinds of choice is made even more apparent by the RPG-like elements

of the game. Avatar plays out like some cross between Mass Effect and Crysis – it's a third person game, with level-ups and skill systems, but you'll spend a lot of that time shooting stuff and really wishing for a either a first person view or a more pliable camera system. It's hard not to think that if the devs had focused on one style of gameplay – dedicated RPG or dedicated shooter – we'd have a much better product, and that rarest of gems: a good movie tie-in!

But there is surprising depth in the odd mix of gameplay on offer. There's a mess of weapons to choose from and equip, the aforementioned two sides to choose (each with their own skill and weapon-sets), a vaguely Risk-style mini-game that lets you 'conquer' planetary regions, and even multiplayer for some mano a' Na'vi carnage. Add to that a variety of vehicles, and there's a lot of ways to alternately explore Pandora, and then blow bits of it up.

In fact, more than anything else, Avatar feels like some kind of single player MMO. The quest structure is pure RPG, with collection quests, mail runs and lots of kill X and bring me their Ys to keep you sort of busy. Too, the branching nature of the game almost seems like a prelude to

getting into the meat of a PvP-based environment.

But that brings us to another issue with the game's design. The back cover copy promises that you'll be able to "Explore the beautiful but deadly Pandora", but in reality it's more of a case of "Exploring as much of Pandora as we can be bothered to render and map collisions for". As we've said, it's easy to compare Avatar to Crysis – the jungle of Pandora is as lush and detailed as anything in Crysis – but instead of open levels you can traverse as you wish, you have levels that are little more than paths through the forest, blocked out by impassable stone walls and log-falls. The copy's right in the planet is deadly, though – the way some creatures spawn in apparently clear areas can really ruin your day.

That said, there's still a certain elegance to the game that at least kept us coming back through multiple sessions, and while the voicing is sub-par, there is a lot of it. It's not quite a game that lives up to Cameron's grand vision, but it's far from the worst film-game adaptation we've played. Faint praise? Yeah, but it's all we got.  DH

PC, PS3, Xbox 360 (reviewed on PC)

**Developer** Ubisoft

**Publisher** Ubisoft

**Website** [www.avatarmoviethegame.com](http://www.avatarmoviethegame.com)

**Graphics**

Very lush, the parts that you can see.

**Gameplay**

An odd mix with limited environments, but at times oddly compelling.

**Sound**

Solid, but let down by poor voice-acting.

**Overall**

Great if you must have more Pandora, but still just a movie tie-in.

80  
71  
73

74%



## MOVIE REVIEW

# Avatar

Is the most expensive film ever made a good investment of your time, or an overblown flight of James Cameron's fancy?

Director James Cameron

Starring Sam Worthington, Zoe Saldana, Sigourney Weaver

**H**ow do you even attempt to review something as big, as looked forward to as James Cameron's Avatar? I saw the film on a couple of days ago, and spent all weekend wondering more about whether or not the James Cameron fans amongst the community would kill me right away if I rate it poorly, or if they'll indulge in a little torture first. Even sight-unseen, Avatar is being considered film of the year material, something akin to the Second Coming rather than a film.

And then, there's the film itself, which raises a lot of interesting questions, and that's never a bad thing in cinema.

Of course, one of those questions is "Is it okay to find a giant blue CGI Sigourney Weaver hot, or does that make me worse than a fury?"

Sanity aside, there is one absolute fact that cannot be denied, and that's as good a place to start with as any – Avatar is without doubt the most accomplished feat of cinematic engineering put to celluloid.

From the opening shots of a lush jungle canopy and the stately approach of a very believable starship into Pandora (the planet upon which all the action is set), this is unlike any film you've seen before, especially in 3D. Just the flyby of this ship harks back to the bravura effects work of 2001, or the opening reveal of the Star Destroyer in the original Star Wars – but in such clarity and depth that every detail screams to be examined.

From there we've got shuttles, orbital landers, military walkers, guns-guns-guns, and all manner of computer interfaces and bits of bobs of background hardware. To many in the know, the king of sci-fi mechanical design is Masamune Shirow of Ghost in the Shell and Appleseed fame, but even he would be impressed with some of the great world-building in Avatar.

And then there's Pandora itself, as much a character (in fact, possibly a stronger character) than anyone else in the film. Like



the future-tech of humanities expansion into space, this is a fully realised world, with an ecosystem so detailed you almost wish Sir David Attenborough would come out of retirement to document it.

Most remarkable of all is the animation of the Na'vi and the creatures that share their homeworld. You might watch Lord of the Rings and think "Wow, that Gollum is one great piece of CGI", but in Avatar the CGI thought almost never occurs to you. Sun shines on rippling skin and muscle and you believe it wholeheartedly – it's a revelation of CGI quality and commitment that demands multiple viewings.

The only issue is, those multiple viewings are only going to highlight some of the deeper flaws of the film.

When it comes to action set-pieces and technical know-how, Cameron really is king of the world, but for characters, he's a little less nuanced. When met half-way by actors like Sigourney Weaver and Stephen Lang (who, if you've not seen him in either Gettysburg or Gods and Generals, is a wonderful discovery), there's no issue; both Weaver's irritable scientist and Lang's gung-ho mercenary are



never less than enthralling. But so much of the film rests on the less than stellar shoulders of Sam Worthington, and despite his flavour of the month status, he's just not that good. Not only is his character at times unlikeable, but like Harrison Ford in Bladerunner, it's obvious that Worthington doesn't really believe in the voiceover narration that Cameron relies upon for a lot of exposition. Curiously, however, some of Worthington's best work is in a couple of to-camera blog-style pieces – in these you can see some very good work, but at other times Worthington relies more on boyish charm than acting chops.

Probably my biggest gripe, however, is



## MOVIE REVIEW

# The Storm Warriors

It's a jump-kicking, sword-swinging, all balletic sequel to *The Storm Riders* – about time!

**Director** Danny and Oxide Pang  
**Starring** Aaron Kwok and Ekin Cheng



reserved for the story. Essentially, *Avatar* is little more than a remake of *Dances With Wolves*, even down to minor characters like the angry-but-noble-betrothed-of-the-romantic-lead, the bigoted-soldier-who-gets-his-comeuppance, and the likeable-fuckup-who-comes-good-in-end. Cameron really brings nothing new to the tale of the soldier who goes native, while at the same time really buying into the noble savage stereotype. For all that the effects and world building of *Avatar* are groundbreaking, there is actually nothing new at all in terms of story and character – corporations are evil, greed is bad, scientists are short-sighted and living with nature is good.

At the end of the day, however, despite its many flaws, I'm still looking forward to seeing *Avatar* again – and I will. It doesn't come close to the ferocious brilliance of *District 9*, or the nuanced melancholy and paranoia of *Moon*, but it's still an epic of considerable enough scope that you can look past the issues of plot and character. It's less a film than an experience, a chance to step onto alien soil and gape in wonder at strange vistas.

And sometimes, that's all you want from a film.  DH



If you've not heard of *The Storm Riders* before, here's all you need to know – it has Sonny Chiba in it, arguably the coolest man alive. On top of that, it's got over the top wire work, an overblown plot that would be laughable were the actors not so passionate about it, and it's just a lot of plain fun.

But it's also over ten years old, so it's kind of odd that all of a sudden a mammoth, 300-hundred inspired sequel has come out, with the same two male leads in the title roles. But it doesn't take long for that over the top wuxia action to win your heart, and before you know it you're caught up in the cheesy plot and having a grand old time.

I'll be brief, lest I sound like I'm making this up.

*The Storm Warriors* recounts the tale of Wind and Cloud, best martial arts mates who find themselves, and their master, Nameless, in the clutches of the evil (and Japanese) Lord Godless, who wants no less than to subjugate all of China under his impressively armoured martial arts heel. In the fight to keep China free, the two embark on an epic journey to discover themselves, their skills, and kill lots of dudes.

There's a handful of female characters, but in true old-school martial arts tradition, they seem to only exist so they can either die, breathily say the leads' names over and over again, or both.

It might sound like I'm giving the film short shrift, but far from it – this is classic wuxia. If you're not familiar with the term, think kung fu ballet, or sword opera, and you'll get the gist. It's all very broad strokes stuff, with journeys of a thousand days and epic philosophies reduced to quickfire scene changes and one or two lines of dialogue. What's important are the emotions, the fight between good and evil, and righteously kicking arse in the most outlandish manner possible. *The Storm Warriors* is a flying success.

Each barely fleshed out plot point gives way



to more and more complex fight scenes, from raging animated invasions to intimate clashes of will between two motionless martial artists that is expressed flash-edited mayhem. The physical fitness and prowess of the leads is at times truly stunning, and is amply matched by some seriously gorgeous effects work. There's also some serious creative minds at work on some of these fights, especially the sequence that sees Cloud deliver a sword blow that summons binding, razor sharp spider webs to bind his foe in.

It may not reach the same level of pathos as *Crouching Tiger Hidden Dragon*, but for pure spectacle, *The Storm Warriors* is both an excellent sequel, and an awesome film in its own right.  DH



**Overall**  
*A great old-school martial arts romp.*

**81%**

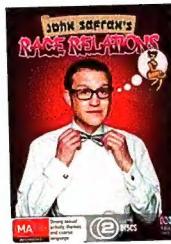
## DISC OF THE MONTH

Oh God oh God, this time of the year is tough for fans of games AND movies. Apart from the big budget end of year epics, you've also got a lot coming out on disc, and between finding time for an MMO addiction, *Dragon Age: Origins*, and everything hot on disc we may as well just get a drip installed and give up on ever actually eating again.

This month we've spent time on catching up with the badguy's in the BSG spinoff telemovie, *The Plan* (which is awesome on Blu-ray), and gotten in some southern crime action with *In the*

*Electric Mist* (based on the book by award winning crime writer James Lee Bourke), but what's really grabbed our attention is the box set of **John Safran's Race Relations**.

Say what you will about Safran – he's loud, brash, and often offensive. But he's also never short of brilliant in his ability to nail awkward truths, and his style of documentary-making should be applauded not only for informing you, but making you uncomfortable and forcing you to re-examine your beliefs.  DH



SPONSORED BY

**SAMSUNG**

# SET BLASTER=A220 I5 D1 H5 P330 E620 T6

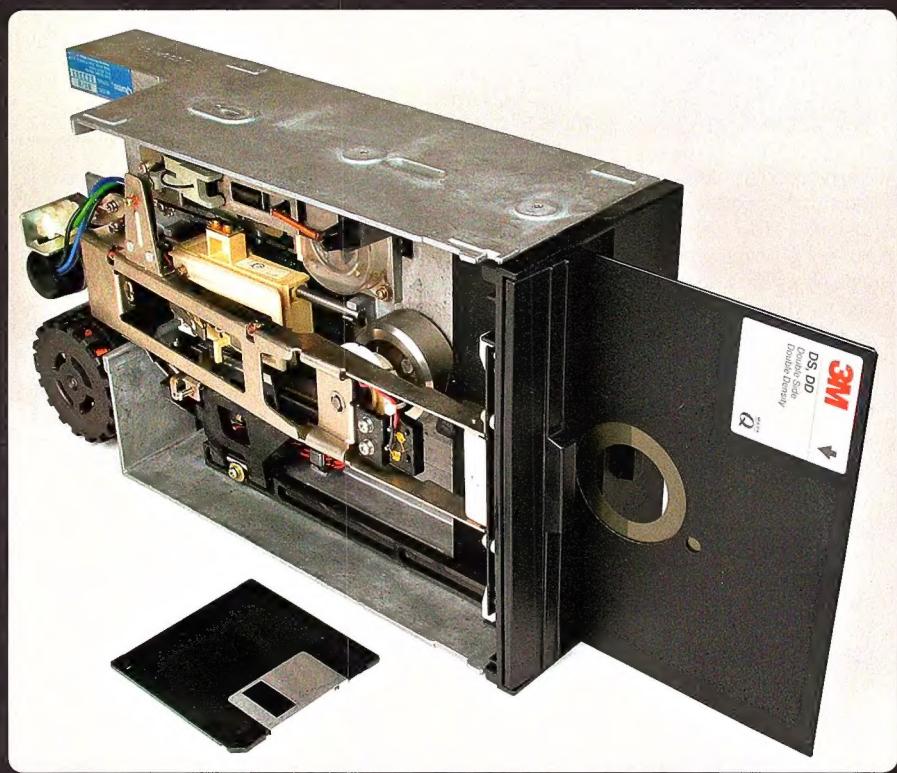
Ben Mansill doesn't miss the good old days.

If you've ever felt even the faintest annoyance about waiting a few minutes for a patch to download, or the half an hour you spent trawling forums for a solution to your weird game glitch, then let me tell you, the kids of today have it easy. Gather round, and gramps will tell you how it used to be...

Back in 1992 I scored my first job in the games biz, as the PC games tech support guy at the now extinct Sega Ozisoft. Once the biggest game distributor in the land, if a game wasn't an EA game, it was probably brought in by Ozisoft. My job was to look after phone and mail (not the 'e' kind, we didn't have that then) enquiries for folks with a PC game that was, in one way or another, just not working.

There were two basic types of problems. Type 1 was a buggered disc, of the floppy variety. A typical game came on a few floppies, some later bastard games came out on over a dozen. The last Sierra Police Quest game had 14 floppies in the box, so the odds of one of them going bung at some point was high. "Send it to Ozisoft and they'll fix it", the shop would tell them, and thus began the often weeks-long wait for the gamer to be able to play a game that they were hanging to play now.

Every disc had to be checked to find the one that was buggered, and there was never a batch of replacement discs we could just drop in the box and return to the customer. We had one precious master set for each game and we'd just make a copy from that for the bad disc and replace it. Thing is, the customer rightly expected a proper looking labelled disk, which we didn't have. The technique for 3.5in discs was to take the bad disc, lever back the metal slider without bending it and remove the spring,



configuration. The other half of the time it was no sound in the game. Back then, mastering the config.sys and autoexec.bat in DOS was essential, and it was a goddamn pain in the butt. First you had to score at least 620k of conventional memory available from your 640k. That was high art, and getting upwards of 630k made you a PC god. Then you needed either

for gaming is dead wrong - it was the salvation.

Patches came to us on disc via post from the developer, and were precious, holy things stored in a heavy dust-proof steel cabinet. We always had a backlog list of customers hanging for some new patch - usually the latest for a sim, as almost every other game just plain worked from the release, simpler things that they were. Sims had complex mechanisms plus die-hard fans demanding perfection. Falcon 3.0 had its own drawer for the many patches it had. We'd have good old blokes right into it calling every day when they knew a patch was due, and they'd drive in to get a copy. Kids of today... Luxury!

Once a week or so the dull days were jolted into life. We sat next to the Megadrive repair technicians, and out of the blue there'd be a "AHHH! F\*%K! That's disgusting!", as all five of them ran backwards in a spreading circle away from a Megadrive that'd just had its case unscrewed, to unleash the family of cockroaches living inside. Consoles are awesome places to live if you're a roach. Warm, dark, safe.

We had it good, though, compared to the Helpline guys. Stuck in a game today? Off you go to GameFAQs. Back then banks of call-centre operators would spend all day telling kids how to get past the 7th stage of Sonic. They all went mad eventually. At least we got really, really good at disk surgery and DOS memory tricks, skills which Windows 95 rendered useless the day of its release. The happiest day of my life.

**Every disc had to be checked to find the one that was buggered, and there was never a batch of replacement discs we could just drop in the box...**

carefully insert a scalpel along the seam and open the case just enough to get at the disc inside, take out the bad magnetic disc inside then drop in the freshly copied good one and piece it all together again. 5.25in discs couldn't be opened, so we had to oh-so-carefully peel off the sticker from the bad customer disc and put it on one of our no-name blanks, and copy the right disc data onto that. All a fiddly pain in the frackin' arse, but restful peace compared to the phone ringing...

That'd be Mum, calling while Kid was at school because his game wouldn't run. This was the Type 2 problem. The hated one. Half the time it was either insufficient conventional memory, or the wrong kind of memory

EMS or XMS memory configured, depending on the game. Then, you needed to set the sound card's bloody IRQ and DMA. This was, perhaps, the most frustrating and idiotic part of early PC gaming hardware. Each game needed different settings at boot up.

Mum, of course, didn't have a clue about all this, and her technofear levels were off the scale. I have wasted many cumulative weeks of my life slowly and patiently talking Mum through editing config.sys and autoexec.bat files. "Type this on the 3rd line, now read it back to me...". Goddamn bloody hell, it was such an utterly wrong way to A: service a customer, and B: grow PC gaming as an accessible thing. Anyone who knocks Windows 95 as the worst thing ever

# PowerColor®

www.powercolor.com

YOU DON'T HAVE TO BE  
TO PLAY HARDCORE

# HARD CORE

EXPAND. ACCELERATE. DOMINATE.

Revolutionary multi-display capabilities,

**ATI Eyefinity Technology**

Accelerate your digital home entertainment, make video editing and transferring to media players/handheld fast and easy,

**ATI Stream Technology**

Unbelievable HD gaming performance & maximum settings,

**DirectX 11 Gaming**



atomic  
Video card manufacturer of the year  
ReaderAwards2003



## Radeon HD 5770

Video Memory : 1GB GDDR5  
Engine Clock : 850 MHz  
Video Clock : 1200 MHz  
Memory Interface : 128 Bit  
DirectX Support : 11.0

## Radeon HD 5750

Video Memory : 1GB GDDR5  
Engine Clock : 700 MHz  
Video Clock : 1150 MHz  
Memory Interface : 128 Bit  
DirectX Support : 11.0



MULTIDISPLAY  
OUTPUT  
DUAL DVI  
HDMI  
DISPLAY PORT



Manufacturer

**TUL**™

TUL Corporation  
www.tul.com.tw

Distributor

**Australia IT**

Australia I.T. Pty Ltd  
+613 9560 3188 (Melbourne)  
+612 9643 1388 (Sydney)  
www.australiait.com.au

Premium Resellers

www.msy.com.au  
www.techbuy.com.au  
www.umart.com.au  
www.pccasegear.com.au  
www.skycomp.com.au



www.scorptec.com.au  
www.i-tech.com.au  
www.pcmaniacs.com.au  
www.skycomp.com.au

# Your new secret weapon.

Level up your system with the  
Intel® Core™ i7 processor Extreme Edition.



Hardcore Gaming Systems

"This system may well be the best and fastest... in the world."

March 2009, PC Authority

"It's nice to know that such power has been invented."

February 2009, APC Magazine

"If you need absolute pants-soiling performance and you need it now then look no further."

March 2009, PC PowerPlay



Look for  
Intel  
Inside®

## STORM i7

- Intel® Core™ i7 975 Quad Core processor, 3.33GHz Overclocked up to 4.4GHz
- Intel® X58 motherboard
- High Performance Corsair 12GB Triple Channel DDR3 RAM
- 2x NVIDIA® GeForce™ GTX 295 1792MB GDDR3 SLI® technology
- 2 Terabyte RAID 0 HDD storage
- Performance Water Cooling System
- Antec TruePower Quattro 1000 Watt Power Supply



## TORNADO i7

LIMITED EDITION

- Intel® Core™ i7 870 Quad Core processor, 2.93GHz Overclocked up to 4.2GHz
- Intel® P55 motherboard
- Corsair 8GB DDR3 Performance RAM
- ATI® RADEON™ HD 5870 1GB GDDR5 DirectX 11
- 1 Terabyte SATA2 HDD storage (2x500GB RAID 0)
- Professional Water Cooling System
- Antec TruePower 650 Watt Power Supply



www.altech.com.au/NRG

ADELAIDE  
(08) 8257 9999  
sales-sa@altech.com.au

BRISBANE  
(07) 3338 6000  
sales-bris@altech.com.au

MELBOURNE  
(03) 8588 7777  
sales-mel@altech.com.au

PERTH  
(08) 9242 8822  
sales-wa@altech.com.au

SYDNEY  
(02) 8831 9999  
sales-syd@altech.com.au

ALTECH COMPUTERS CORPORATION is responsible for and has verified any statements or computer system product specific claims contained herein.



Channel Partner  
Premier  
Member 2009

Premium Solutions  
from a Premier Partner

©2009 Intel Corporation. All rights reserved. Intel, the Intel logo, Core i7 and Core i7 Inside are trademarks of Intel Corporation or its subsidiaries in the U.S. and other countries. Price, specifications, availability and terms of offers may change without notice, other fees may apply.